CAHNERS PUBLICATION

Brick & Clay RECORD

APRIL, 1960

BESSEMER (PA.) PLANT OF METROPOLITAN BRICK, INC.

world's *largest** brick kiln supplied by BONNOT Extruders continuously for 30 years

STEP AHEAD WITH BONNOT

CRUSHERS • HAMMER MILLS • DRY PANS
WET PANS • GRINDERS • FEEDERS • CUTTERS
REPRESSES • SPECIAL MACHINES TO ORDER
DIRECT FOUNDRY SERVICE • DIES • MIXERS
VACUUM MACHINES • SPECIAL EXTRUDERS
AUGER MACHINES • PUG MILLS

You can use your own mathematics to compile **how many millions of brick** have been produced by the pair of Bonnot Extruders installed by Metropolitan Brick, In in their Bessemer (Pa.) plant when it was rebuilt after a fire in 1929.**

Two of eight Bonnot Extruders now operated by Metropolitan, the veteran "Bessemer twins continue to supply the half mile long horseshoe kiln,* longest of its kind in the world.

"Whether it's big, rugged 'pavers' (today used principally for tunnel work and industrial floors) or colorful architectural face brick, these extruders "deliver the goods on their **year-in, year-out schedule,**" according to Ralph G. Sterling, Metropolitan vice president in charge of production.

"Regardless of our demands for quantity and quality," he continues, "Bonnot machines operate efficiently and economically, and when service on wearing parts is necessary, we can count on real cooperation from Bonnot's own foundry."

Proved by Performance . . . Advanced in Design to Meet Modern Demands, Bonnot Equipment can produce profitably in your plant. Your questions will get prompt attention from Bonnot Engineers.

The BONNOT Co.
CANTON 2, OHIO

**Additional Bonnot equipment included 2 Cutters, 2 10' Dry Pans, 2 Plate Feeders, 2 Disc Feeders and 6 Represses.

Circle Service No. 6

TECHNICAL BULLETIN

BEL-RAY COMPANY, INC.

Farmingdale, New Jersey

BELCO No. 5016 GREASE

LUBRICATES KILN-CAR BEARINGS AT TEMPERATURES UP TO 1200F

- guaranteed not to carbonize
- does not harden
- forms no decomposition products
- eliminates dripping on tracks
- cuts down pusher ram pressures
- prevents bumper damage
- keeps bearings clean and free
- lasts 3 months between regreasings
- reduces annual lubricant costs

THE WHEEL ABOVE AT LEFT with its clean, free-running bearing was photographed exactly as it came off the jacked-up kiln car. When the picture was taken, this car had been in service 4½ months since other grease residues were cleaned out and bearings lubricated with Belco #5016 Grease. Bearings had received no other care except routine regreasing 3 months after that. The bearing below, by contrast, shows caked solids from a synthetic oil formerly used at the same kiln. This particular bearing had actually been soaked in solvent and partially cleaned off. It had made only a few passes through the kiln before it became clogged with abrasive residue.

WRITE FOR FREE SAMPLE AND LITERATURE

Circle Service No. 11

"6,000,000 UNIT INCREASE WITH ADDITIVE-A®" —says Indiana brickmaker.

MARTINSVILLE, INDIANA—Mr. Thomas D. Fleming, manager of Martinsville Brick Co., says: "After using Additive-A clay conditioner for a full year, we are able to compare results. We found that due to reduction of tempering water, we increased our production by approximately 6 million brick units. During this period we did not have a single complaint from dealers on chippage, scumming, laminations or variation in size. We wouldn't operate without Additive-A because it helps us produce more and finer quality bricks at less cost."

For further information on Additive-A, write to:
Chemical Products, Department No. BCR-40
Kimberly-Clark Corporation,
Neenah, Wisconsin

Kimberly-Clark Corporation Contributing Associate S C P I

Circle Service No. 12

LEADING CLAY JOURNAL OF THE WORLD
A CAHNERS PUBLICATION

Brick & Clay RECORD

APRIL, 1960

Vol. 136. No. 4
5 SOUTH WABASH AVE.
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FRanklin 2-6880

Established 1892
now in 68th year.

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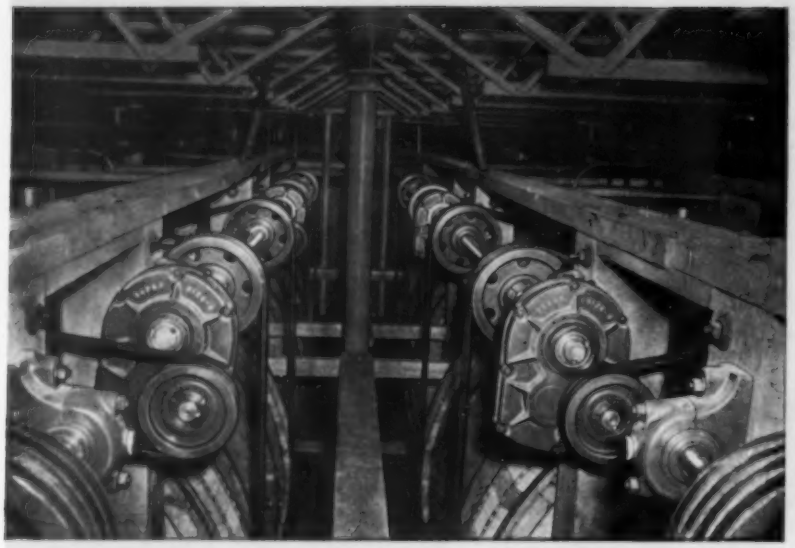
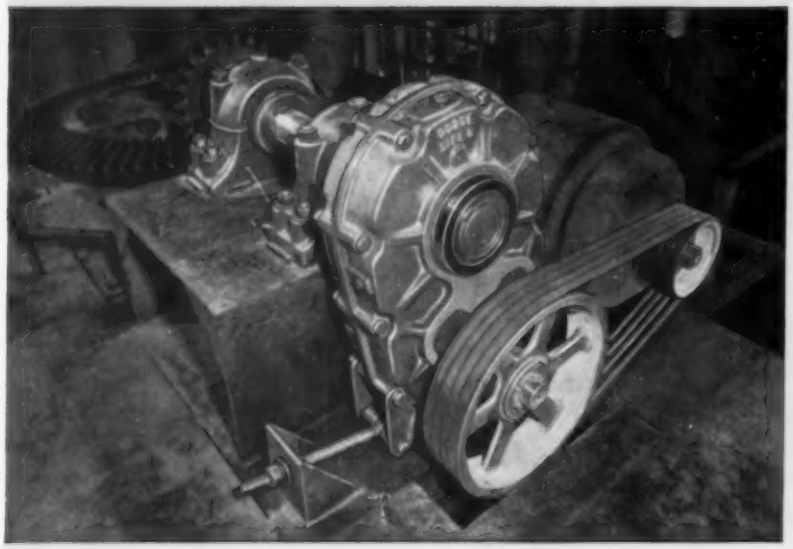


DODGE TORQUE-ARM SHAFT MOUNTED SPEED REDUCER

Install it anywhere—with minimum time and effort. Here is an overhead installation on tanning drums. Torque-Arm reducers are resistant to acid fumes, salt water environment, moisture.



DODGE TORQUE-ARM SHAFT MOUNTED SPEED REDUCER

Can be positioned any place on the entire length of the shaft. It locks into place on *both* sides of the housing. Note modified torque arm on this installation on a mixer in a beverage plant.

The Speed Reducer Idea that

Two things account for the record popularity of Dodge Torque-Arm Speed Reducers. First, they cost less to install since they require no foundations, sliding motor rails or flexible couplings. Second—and most important—these modern reducers as developed by Dodge perform *brilliantly*. Tens of thousands of installations underscore Torque-Arm dependability. Torque-Arm is America's *quality* shaft mounted speed reducer!

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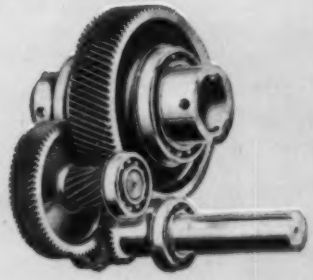
Rugged semisteel housing— a solid backbone for solid service

Here is a tough, corrosion-resistant housing with the strength to hold bearing seats in line for the life of the unit. Perfect shaft and gear alignment are assured by doweling the matched halves together and boring in line. No gear is overhung. Loads are carried easily, contributing to Torque-Arm's long life and high efficiency—97% in double reduction models, almost 99% in single!

AGMA rated gears— quality-guarded by continual tests

These helical gears have soft cores to withstand shock—and hardened surfaces to resist wear. Their quality is guarded in manufacture and assembly by the most modern methods of quality control, including inspection for runout, tooth spacing, helical lead and involute profile. They run quietly, mesh precisely. Teeth are crown shaved for maximum contact area. Gears are shrunk on their shafts to prevent shifting.



Modern double-lip seals keep oil in and dirt out

Modern synthetic, double-lip seals of the highest quality keep oil in and dirt out of the reducer case. These seals offer protection for the unit from dust and dirt and just as effectively insure cleanliness when operating in laundries, textile mills, food processing plants.

Re-ally Clicked!

angle and extended input shaft styles. Optional equipment includes a positive, sealed-in backstop and a positive overload release.

Ask your local Dodge Distributor. Or write us for our 64-page Torque-Arm Speed Reducer Bulletin, complete with engineering data and easy selection tables.

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DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery."

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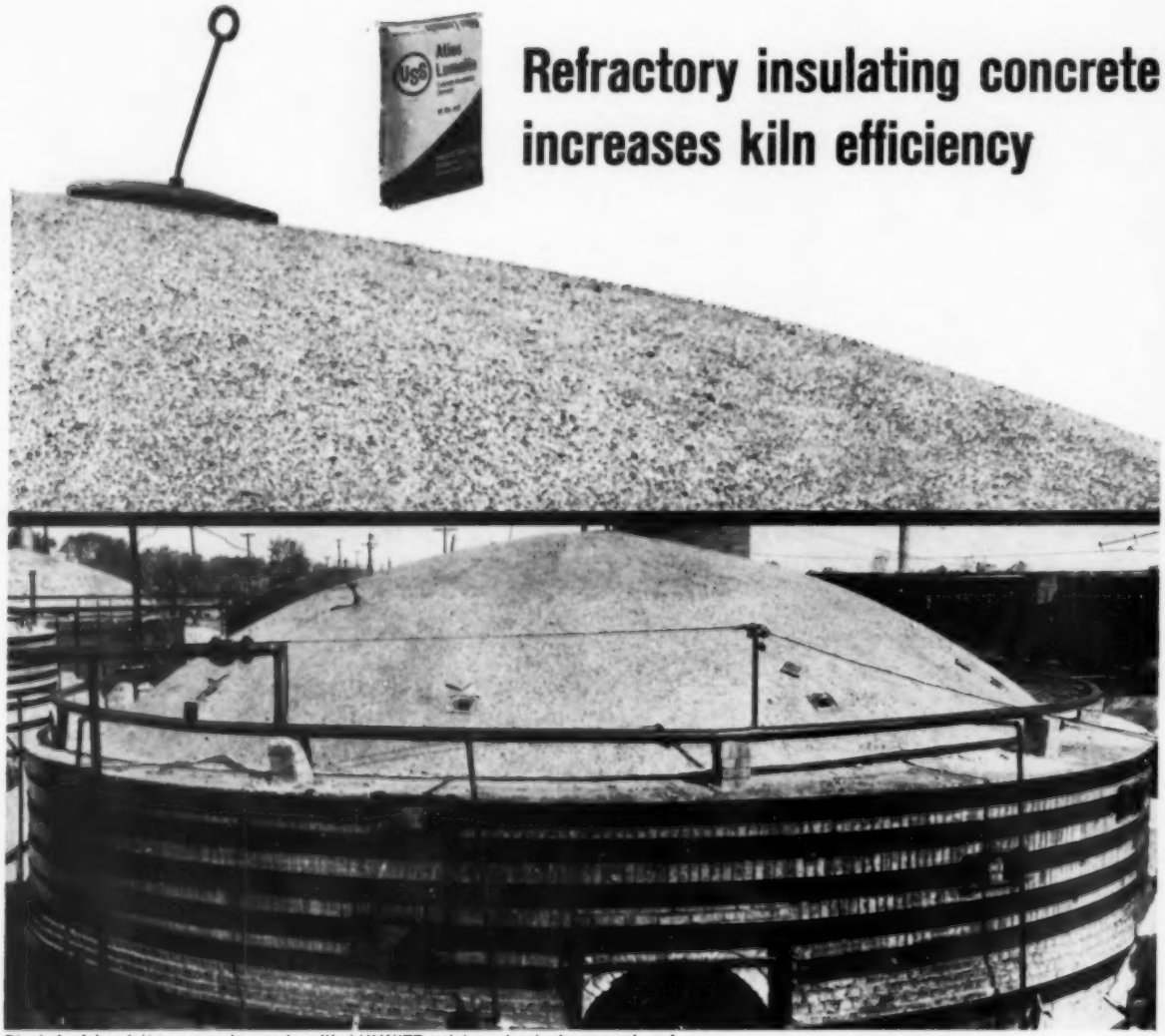

Refractory insulating concrete increases kiln efficiency

Blanket of insulating concrete, made with LUMNITE calcium-aluminate cement, cuts heat loss and improves efficiency of periodic kiln at Mason City (Iowa) Brick & Tile Co.

Field reports continue to confirm the substantial savings realized when periodic kiln crowns are topped with refractory insulating concrete made with LUMNITE calcium-aluminate cement. Fuel costs are greatly reduced, burns are more uniform, and ware in bottom courses is burned harder.

Placement of crown insulation is an easy operation: Neat grout of LUMNITE cement and water washed over kiln crown . . . 1 to 4 mix of LUMNITE and Vermiculite (by volume) placed 2" thick over crown . . . several firings later, 1 to 2 grout of LUMNITE and sand applied over crown insulation to provide seal coat for maximum durability and weather protection.

Many brick plants keep a supply of LUMNITE or their choice of castables ready for immediate use. Castables are convenient packaged mixtures of LUMNITE and aggregates selected for specific temperature and insulation needs . . . just add water and mix on the job. Castables are made by manufacturers of refractories. For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

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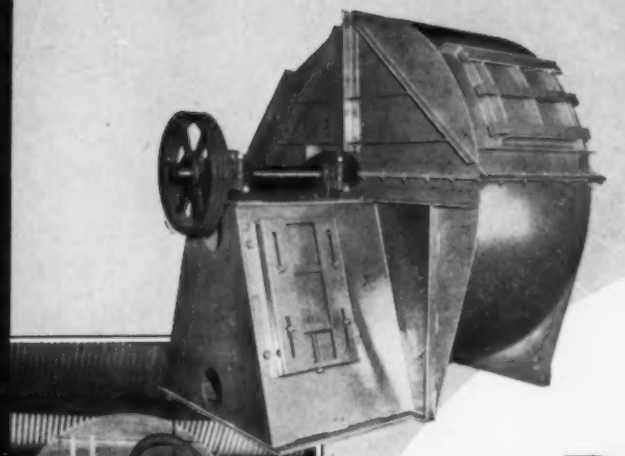
HI-DRAFT FANS
A tubeaxial "Hi-Draft" fan for periodic down draft ceramic kilns.



TYPE "J" FAN
Delivers high air volumes at moderate pressures. May be built in a variety of arrangements for different applications.

In our 65th year

ROBINSON *Salutes*

The AMERICAN CERAMIC SOCIETY

during its

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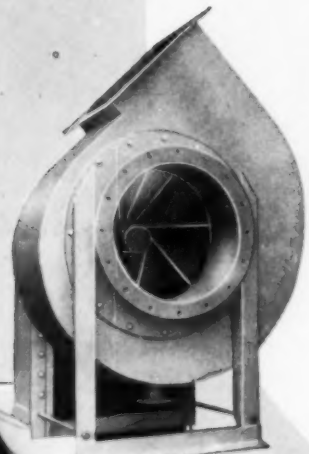

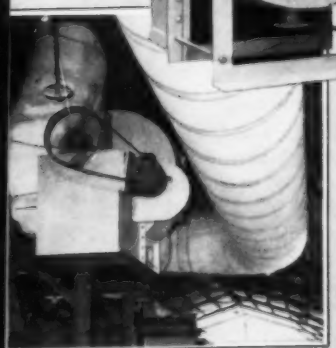

TYPE "AE-6-BB" EXHAUST FAN
Heavy duty exhauster handles air in moderate volumes, at moderate to high pressures. Suitable for many uses.

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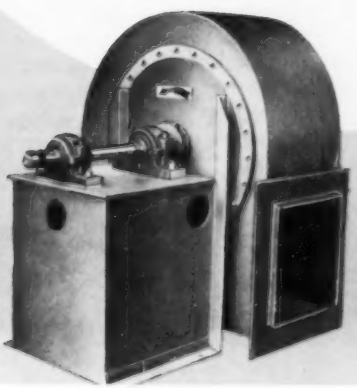

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Designed for recirculating kiln air at temperatures up to 1650° F.

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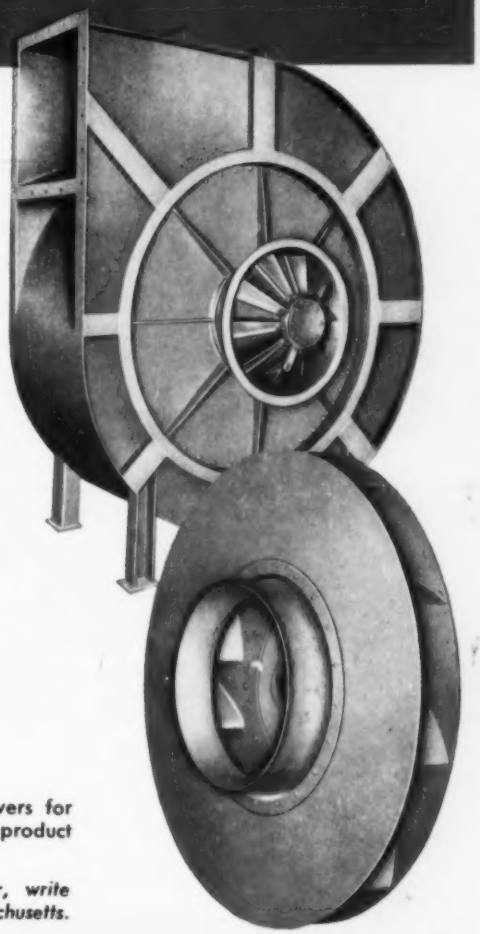
NEW
from
Westinghouse

PRESSURE BLOWERS
WITH AIRFOIL BLADING



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HIGH CAPACITY PRESSURE BLOWERS
have these superior features

1. **EXCLUSIVE AIRFOIL BLADING**
   Lowest horsepower . . . quieter operation
2. **EFFECTIVE INLET CAPACITY CONTROL**
   Stable part load performance . . .
3. **WESTINGHOUSE DESIGNED BLOWER AND MOTOR COMBINATION**
   One source warranty . . .

Use Westinghouse Standard and High Capacity Pressure Blowers for 50 cfm-65,000 cfm, 8 oz. to 36 oz. pressure for combustion air, product cooling, liquid agitation, or process applications.

Call your nearby Sturtevant Division Sales Engineer . . . or, write Westinghouse Electric Corporation, Hyde Park, Boston 36, Massachusetts.

YOU CAN BE SURE . . . IF IT'S Westinghouse

PLANTS AT HYDE PARK, MASS., LA SALLE, ILL., MEDFORD, ORE.

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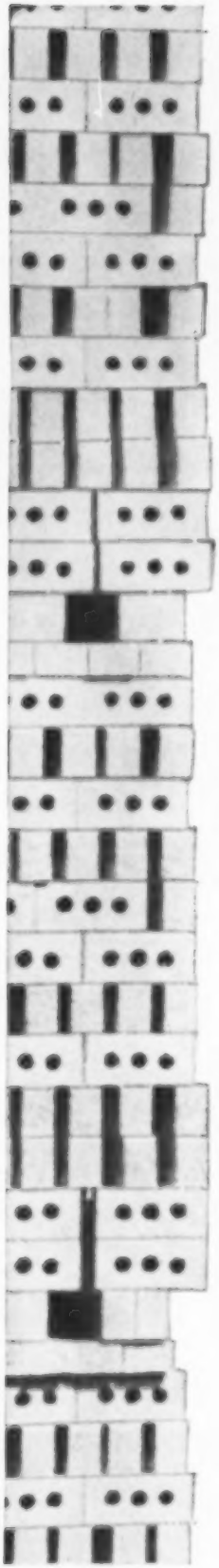
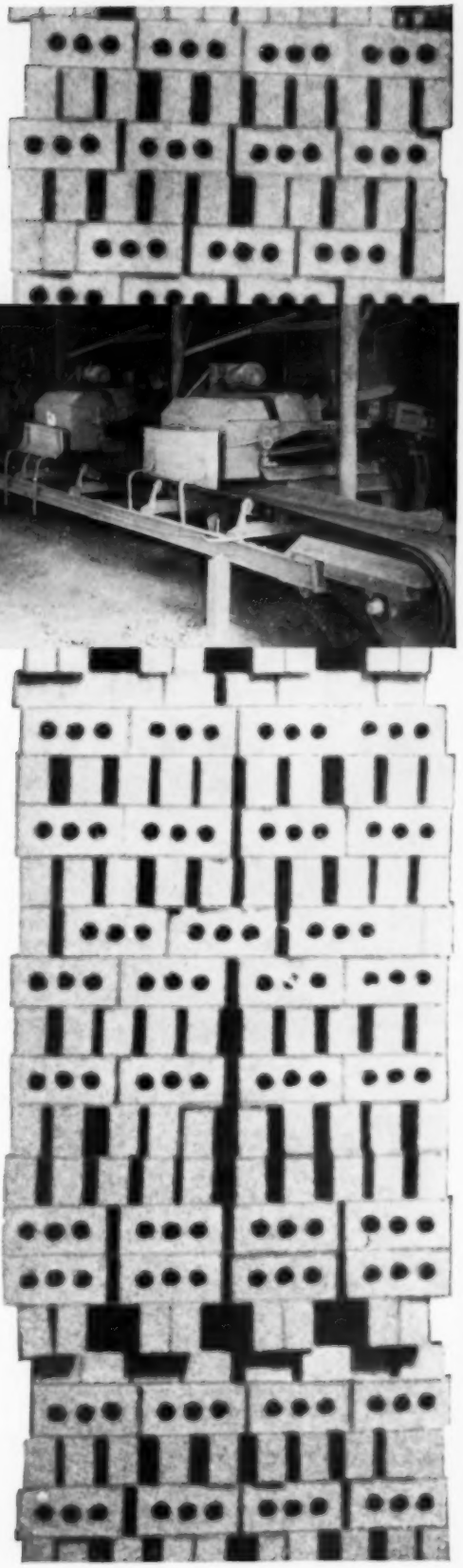


Controls are set and these Waytrols proportion materials onto the make-up belt at a constant rate throughout a run.



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Brick size, colors and texture run the same month after month"

Building bricks by the millions are produced in the highly automated plant of Payne Brick Company, Elgin, Texas. Colors, size and texture are duplicated by accurate, continuous proportioning of materials going into their make-up.

Jeffrey WAYTROLS® handle that proportioning — weigh-feed shale, red clay and calcined clay at the head of the conveyor, add barium carbonate later to kill scumming. Because of the accuracy of the Waytrol, no excess barium need be added to assure an adequate quantity; sizable savings result from avoiding this waste.

Waytrols will save on labor where you're doing manual measuring or weighing, and by changing from batch to continuous feeding. Catalog 941 describes this automatic weigh-feeding equipment. For a copy, write The Jeffrey Manufacturing Company, 916 N. Fourth Street, Columbus 16, Ohio.

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Circle Service No. 18

Temple B'nai Jehudah Kansas City, Mo. Architects, Kivett & Myers & McCallum received special AIA awards for outstanding brick design. Masonry by V. S. DiCarlo Construction Co.

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MASONRY CONSTRUCTION and CLIPPER MASONRY SAWS. Both are . . .

- Highest Quality Obtainable
- Most Durable You Can Use
- Most Attractive in Price and Appearance
- Most Versatile for Any Construction

No wonder Masonry Construction and Clipper Masonry Saws have done more to add Beauty, Permanence and Economy to residential and building construction the world over.

Clipper
"CUTS RIGHT THRU"
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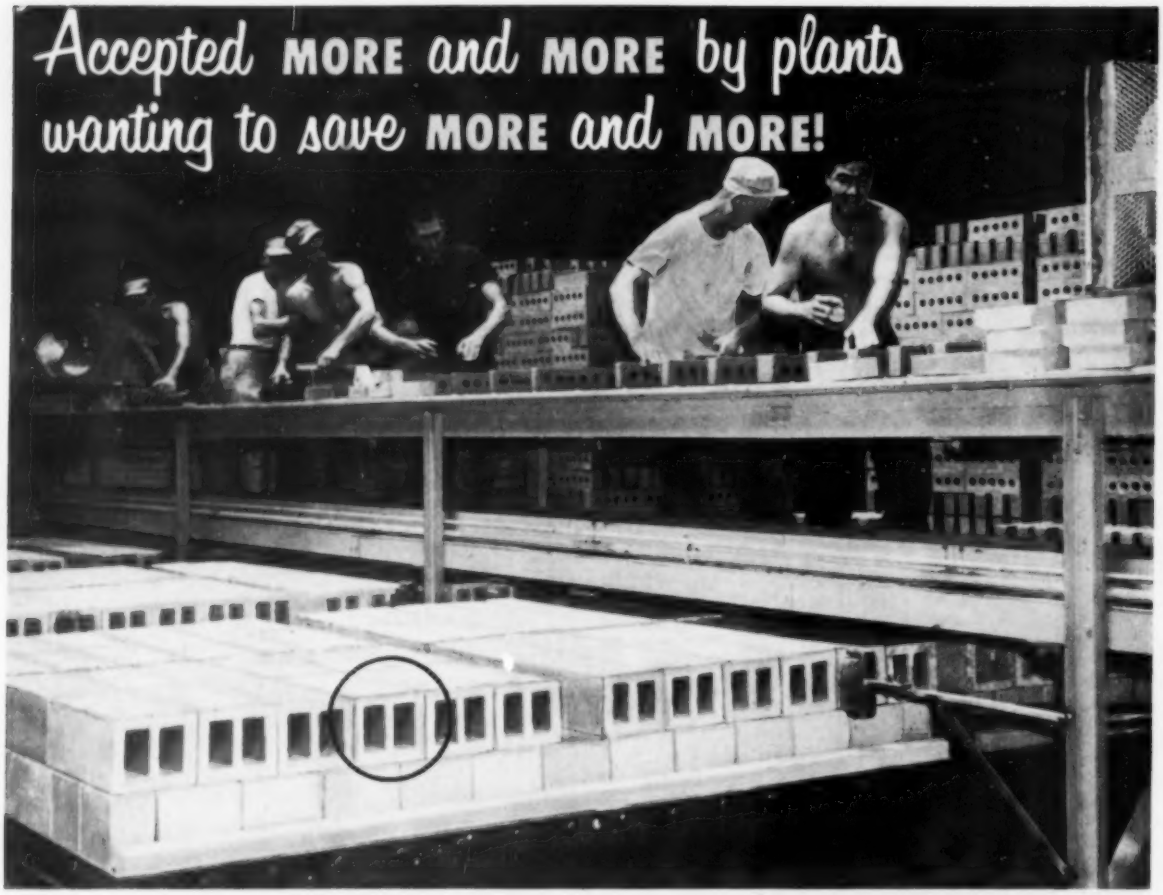
FACTORIES IN ENGLAND — FRANCE — GERMANY — ITALY
Circle Service No. 19

Accepted MORE and MORE by plants wanting to save MORE and MORE!



PHOTO—Cloud Ceramics No. 2 Plant, Concordia, Kansas. This modern plant uses 7" x 8½" x 19½" PACO car tops on top deck; 4½" x 8½" x 8¼" PACO car tops, with light weight insulation, for perimeter.

PACO CAR TOPS

More and more tunnel kiln brick producers are finding they can reduce car top replacement costs as much as 50% with PACO! And, here's why PACO car tops last longer. They are made from the mineral pyrophyllite, a superior raw material. The result is a stronger, lighter weight car top that is highly resistant to thermal shock. PACO car tops do not have a softening point below actual fusing point, providing greater resistance to hot load deformation. The result is better, more efficient production. They are easy to handle and install, and simple to replace individually as needs.

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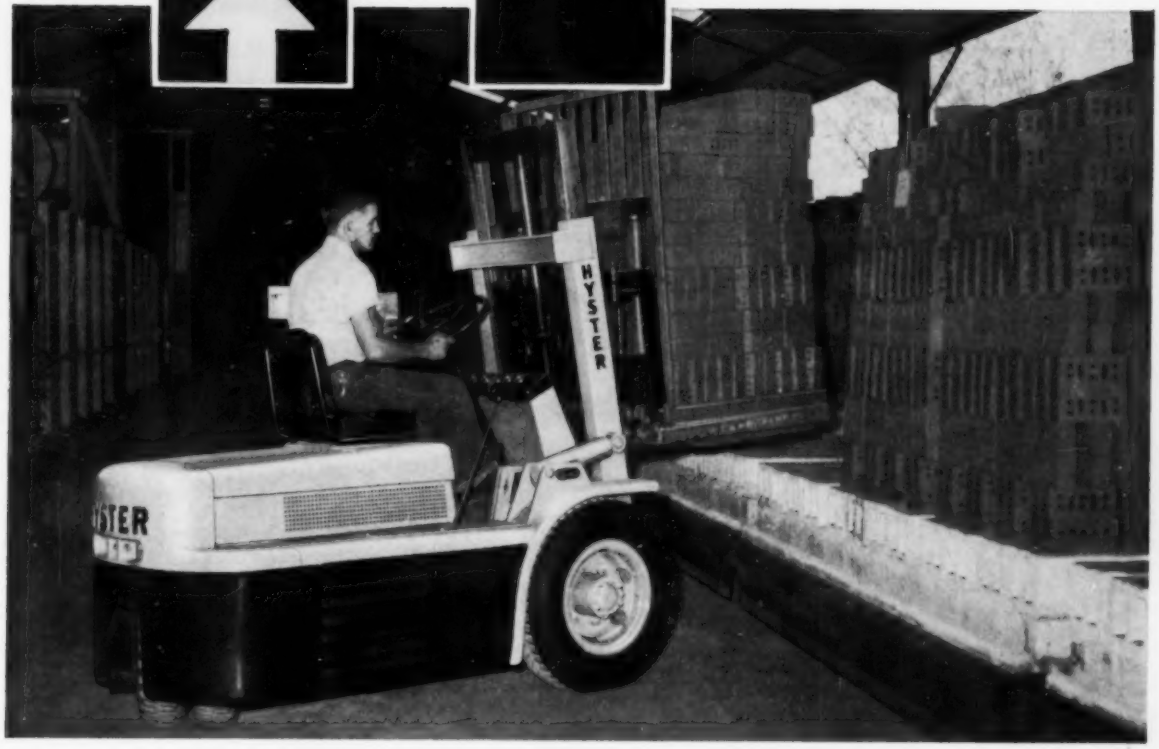
Circle Service No. 20

HYSTER



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best for brick handling –
Only
HYSTER® has it!

Only Hyster trucks have trunnion steering—work in closer quarters than any other 2,000 through 5,000 lb. pneumatics.

Rounded rear end, short turning radius, power steering (optional) — for maximum maneuverability in kilns, yards, box cars.

Easiest trucks to service and maintain.

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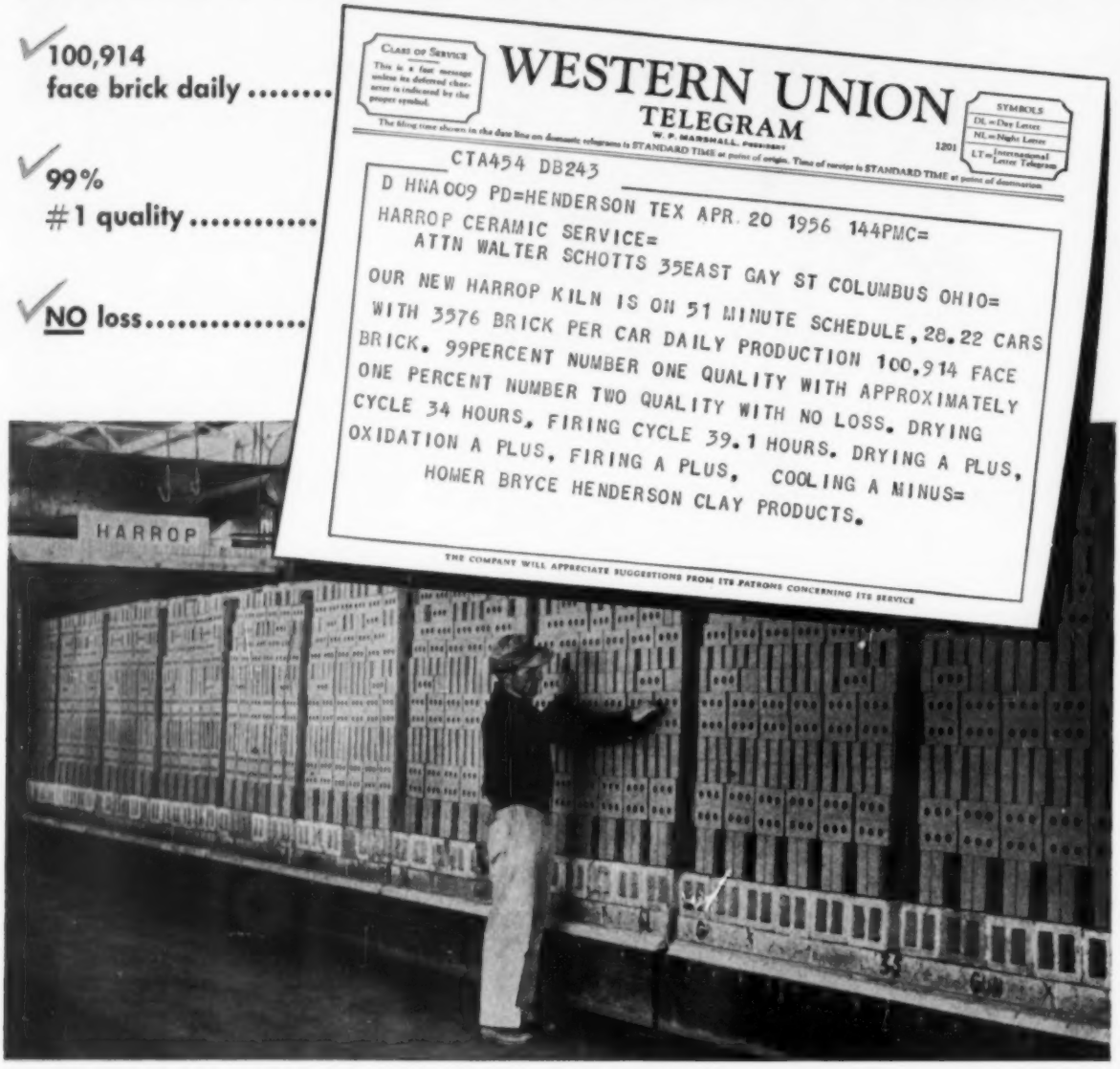
Circle Service No. 21

Here's how HARROP KILN No. 3 performs at Henderson Clay Products

✓ 100,914 face brick daily .....

✓ 99% #1 quality .....

✓ NO loss .....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OUR NEW HARROP KILN IS ON 51 MINUTE SCHEDULE, 28.22 CARS
WITH 3576 BRICK PER CAR DAILY PRODUCTION 100,914 FACE
BRICK. 99PERCENT NUMBER ONE QUALITY WITH APPROXIMATELY
ONE PERCENT NUMBER TWO QUALITY WITH NO LOSS. DRYING
CYCLE 34 HOURS, FIRING CYCLE 39.1 HOURS. DRYING A PLUS,
OXIDATION A PLUS, FIRING A PLUS, COOLING A MINUS=
HOMER BRYCE HENDERSON CLAY PRODUCTS.
THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

Latest Harrop Dryer and Kiln installation for Henderson Clay Products, Henderson, Texas. Twin Dryer is 184' long, Tunnel Kiln 421' long. Natural gas fired, with firing temperature approximately 2150°F.

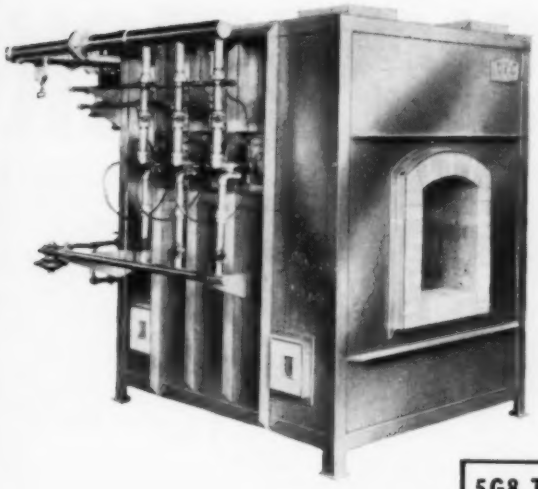
Again . . . .
Practical Ceramic Engineering, put profitably to work in Tunnel Kilns . . . Dryers . . . Plant Design

HARROP

Very probably Harrop can help *you* speed production and raise quality of whatever ceramic products you make. A non-obligating consultation on your proposed new installation will be gladly arranged.

Harrop Ceramic Service Co.
35 EAST GAY STREET COLUMBUS 15, OHIO

Circle Service No. 22



high temperature testing kiln

5G8 Testing Kiln

Cuts operational and maintenance costs!

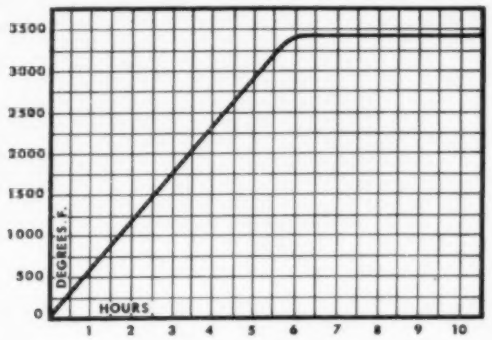
NOW—High capacity, high operating temperatures and versatility... combined especially for experimental work in the ceramic field. *Compare* the DFC High Temperature Test Kiln, then judge for yourself.

Capacity: 15 cubic feet.

Carefully planned chamber dimensions afford maximum utilization of firing space. For smaller loads a false hearth may be installed to reduce firing space and costs.

Wide Range: 500° F. to 3400° F.!

Simple burner arrangement permits controlled low temperature drying, soaking or holding. Temperature can be increased at the rate of 150° to 500° F. per hour (up to 3000° in six hours). Lower ranges are attained simply with a gas-air mixture through one or more burners. Higher temperatures, above 3100° F., are made possible by the use of proportioning control of injected oxygen. Needs only a 16-oz. motor blower.



5G8 Kiln
Typical time-temperature curve

Lower cost—Longer life—More for your equipment dollar! Air-cooled gas-air mixers, refractory tunnel nozzles, motor blower and oxygen metering equipment are the basic elements of the combustion system. NO RECUPERATORS OR REGENERATORS, making the kiln simple in design, less expensive to buy, less expensive to maintain.

Safe to operate—Convenient! Front loading; no need for heavy auxiliary lift equipment. No loading platform; load through the door at floor level.

Flexibility of temperature control! Choose your own control system to fit your program. Precision temperature control through the entire range can be provided.

SPECIFICATIONS:

Interior dimensions: 27" wide x 36" long x 42½" high
Door dimensions: 18" wide x 22½" high
Over-all dimensions: 7' x 10'

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Denver Fire Clay Company

3033 Blake Street • Denver 17, Colorado

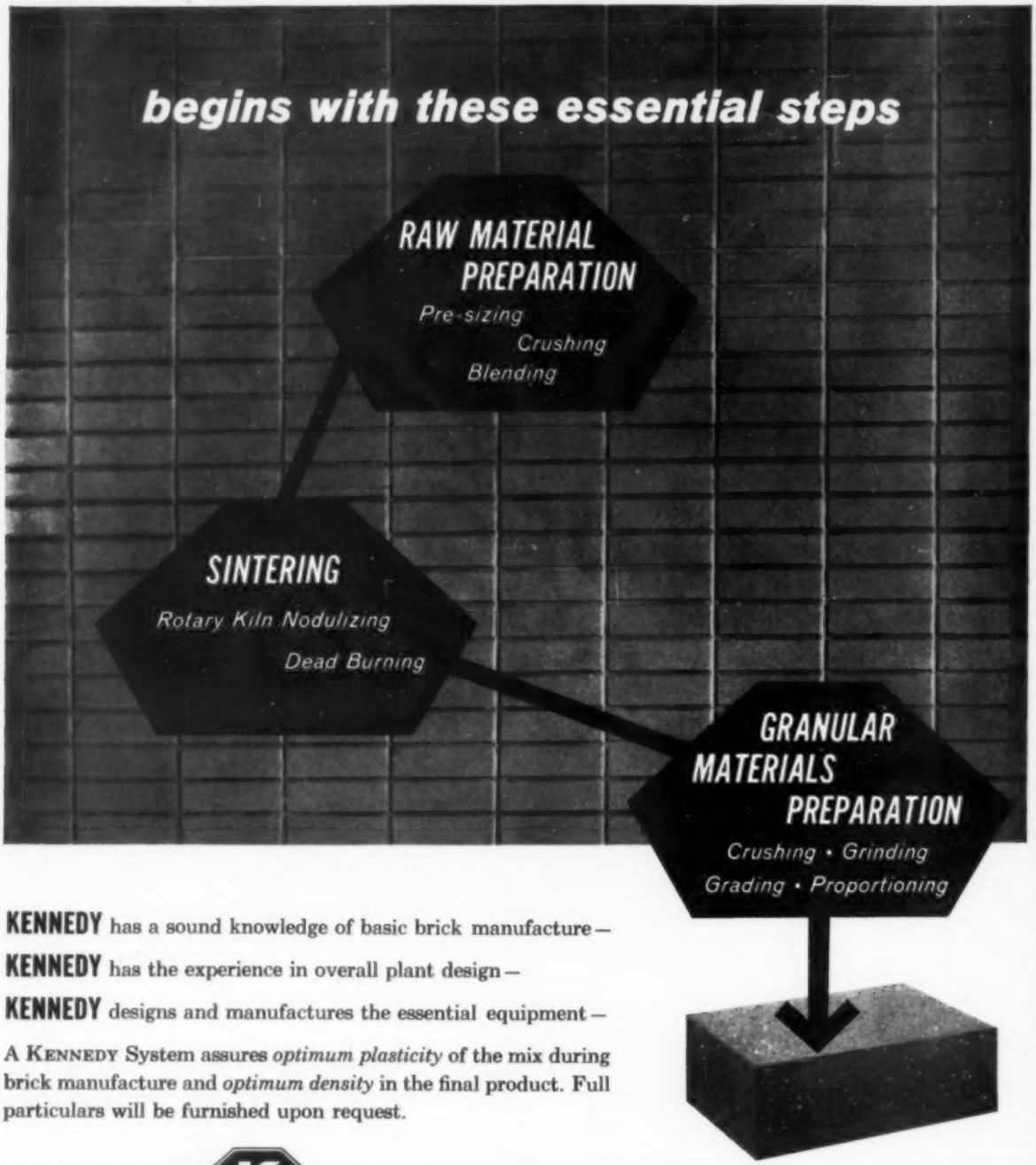
Please send descriptive literature on DFC testing kilns.

My kiln is used for:.....
Name:.....
Company:.....
Address:.....
City:.....Zone:.....State:.....

DFO-10

Circle Service No. 23

QUALITY BASIC BRICK



KENNEDY has a sound knowledge of basic brick manufacture—

KENNEDY has the experience in overall plant design—

KENNEDY designs and manufactures the essential equipment—

A KENNEDY System assures *optimum plasticity* of the mix during brick manufacture and *optimum density* in the final product. Full particulars will be furnished upon request.

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Circle Service No. 24

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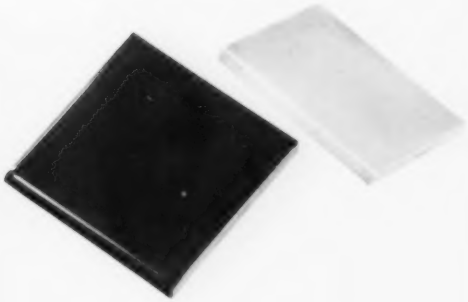

MASON Color and Chemical Works, Inc.

East Liverpool, Ohio, U.S.A.

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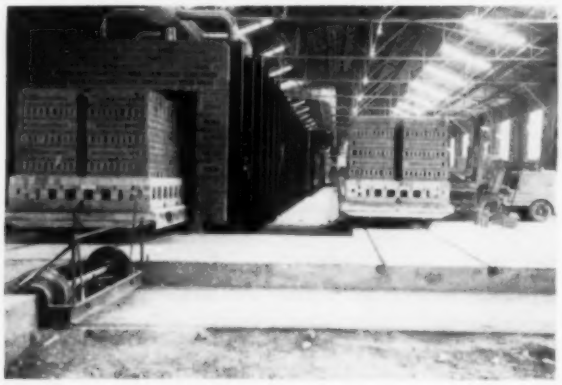

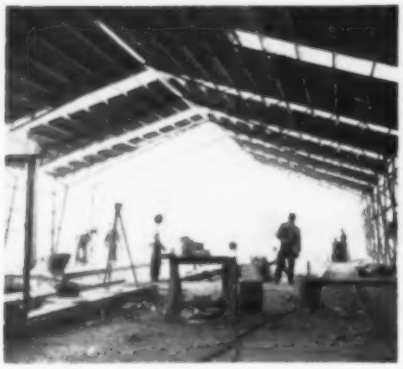

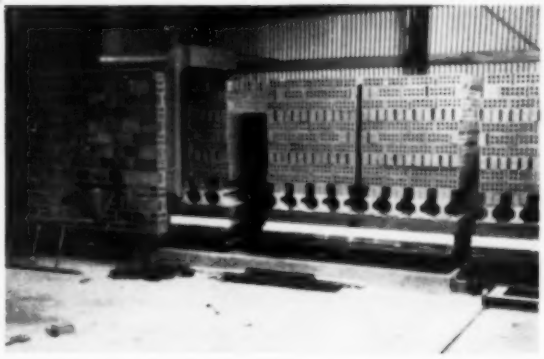

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OHIO TUNNEL KILNS produce the most UNIFORM BURNING and even colors with the least possible loss!

OHIO TUNNEL KILNS cost less installed in your plant for they are produced in volume at a minimum cost, all the material is fabricated in our own shop and erected by our own crews!

OHIO TUNNEL KILNS will fit your operation and pocketbook! All of the exclusive features are yours at no extra cost.

***VISITORS** are always welcome at our shop and when you are close to central Ohio we would appreciate your stopping in. We will be glad to arrange to have you vist both "in-operation" and "under-construction" installations.*

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• LOW COST •

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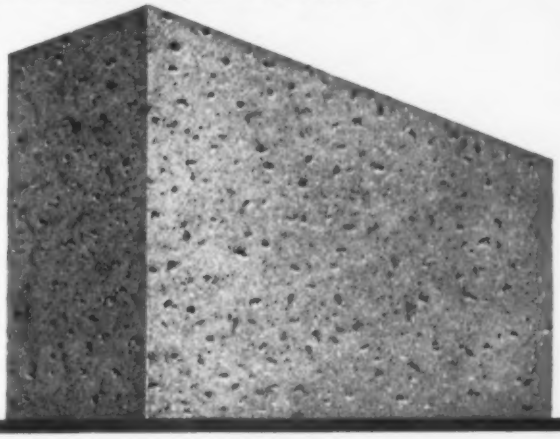
Circle Service No. 26

Supplier of first quality calcined bauxite to every major manufacturer of high alumina firebrick and super refractories



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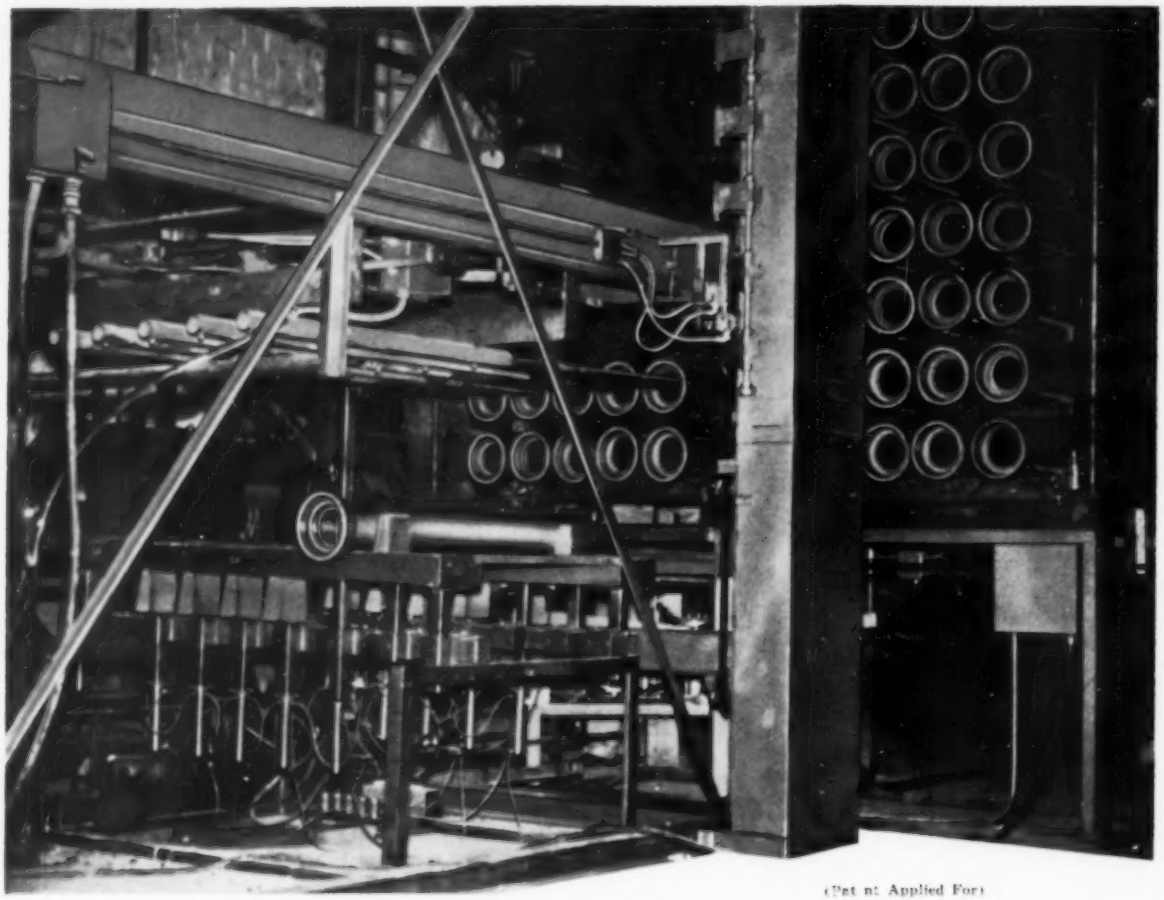
Circle Service No. 27

Pearne and Lacy
AUTOMATIC RACK LOADER



(Pat nt Applied For)

The automatic sequence of operations provide for a continuing flow of pipe from the finishing station to the racks.
Pipe rolls direct from the finishing station to the indexer where it is picked up and inserted into the rack tray. Racks are automatically positioned for pick-up by the trucker. No interruptions in the operation waiting for the trucker. The complete loading operation is automatic except for the trucking. Rack loader is adaptable for all size of pipe handled horizontally. Specially designed light weight racks and trays are also available.

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Engineers and Manufacturers of Automatic Handling and Finishing Equipment for the Ceramic Industry.

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PEARNE AND LACY INC. MACHINE COMPANY

Circle Service No. 28

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It is generally conceded that the highly valued "back up market" has been lost to the concrete products industry for many years.

A TYPICAL LANLY LAY-DOWN DRYER

Now comes a "light on the horizon" with the inception of the fired clay block. Here is a versatile product which unlike concrete does not absorb moisture. Cracking is virtually eliminated. Quality control during its manufacture assures uniformity of size and shape and the attractive color feature as in bricks makes it highly competitive with concrete blocks.

Why not investigate fully and contact us relative to your heat processing needs. We'll work closely with your organization to your satisfaction as we have with so many other manufacturers.

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Circle Service No. 29

Allied Engineering reports further on precalcined shale

In April of 1959, in *Brick and Clay Record* and *Ceramic Industry*, Allied Engineering reported on the effect of calcining a low-grade, high-carbon fire clay to be used as grog in the body.

The clay was calcined at 1400° F. and, when mixed in the proportions of 50% raw clay plus 50% calcined clay, showed a distinct advantage in the oxidation of the product.

We at Allied think it will be of interest, and of considerable value to many in the industry, to further report the results of a similar test on precalcining *shale*. The ground shale, as received from the plant screen, was used for both the raw and calcined material. The calcine was fired at 1500° F. in 30 minutes through a rotary calcining kiln.

The screen analysis before and after calcining is shown in table I.

Note the total per cent residue on the 100 mesh screen before calcining is 79.78% and 85.81 after calcining, whereas the percentage through 100 mesh before calcining is 20.22% and after calcining is 14.20% showing there is a loss in fines from the calcination. However, there was very little dust coming from the stack. The use of a dust collector plus a vibrator on the steel stack, at this temperature, would practically eliminate dust loss in the calcining process.

The shale before and after calcining, analyzed as shown in table II.

This shows the degree of impurity expulsion by calcining rapidly at 1500° F. This temperature is about 100° below that required to drive out the last atom of sulfur. Remember the purpose of low calcination, besides economy, is to maintain high strength and low absorption.

Mixtures

Raw shale, plus calcined shale-blends, were made into 1¾" x 1¾" x 5" bars in the de-airing machine using 26" vacuum. These bodies consisted of 100% raw shale, 75% raw shale plus 25% calcine, and 50% raw shale plus 50% calcine.

Firing

Two firing cycles were used in the tests. The bars were fired with high excess air to 1850° F. in 15½ hours (also in 6½ hours) heating up time, when the burners were then shut off.

Results

The results are shown in table III.

Note in large photograph at right (figure IV) the excessive black core in the raw shale bars fired at both 15½ and 6½ hours. Note also that the bars containing 25% calcine plus 75% raw shale still retain 40% and 65% core.

SCREEN ANALYSIS

Mesh No.	Per Cent Before	Per Cent After	Cumulative Percentage Before	Cumulative Percentage After
On 8	9.83%	7.94%	9.83%	7.94%
10	11.14%	9.32%	20.97%	17.26%
14	11.05%	10.62%	32.02%	27.88%
28	20.05%	21.93%	52.07%	49.81%
65	21.64%	27.64%	73.71%	77.45%
100	6.07%	5.36%	79.78%	85.81%
Thru 100	20.22%	14.20%		

TABLE I

Chemical Analysis	Before	After	Approx. Per Cent Removed By Calcination
Loss of Ignition	7.13%	0.60%	92%
Total Carbon	0.70%	0.055%	92%
Total Sulfur	0.12%	0.041%	66%

TABLE II

Shale-Calcine Mix	Average Linear Shrinkage: Drying	Heating Up Time to 1850° F.: 15½ Hrs. Firing	15½ Hrs. Total	6½ Hrs. Firing	6½ Hrs. Total	Per Cent Core: 15½ Hrs.	6½ Hrs.
100% Raw Shale	5.0%	4.25%	9.25%	3.0%	8.0%	65%	75%
75% Raw + 25% Calcine	4.0%	4.25%	8.25%	2.0%	6.0%	40%	65%
50% Raw + 50% Calcine	2.5%	4.25%	6.75%	2.0%	4.5%	Clear	No Core Very Slight Discoloration

TABLE III

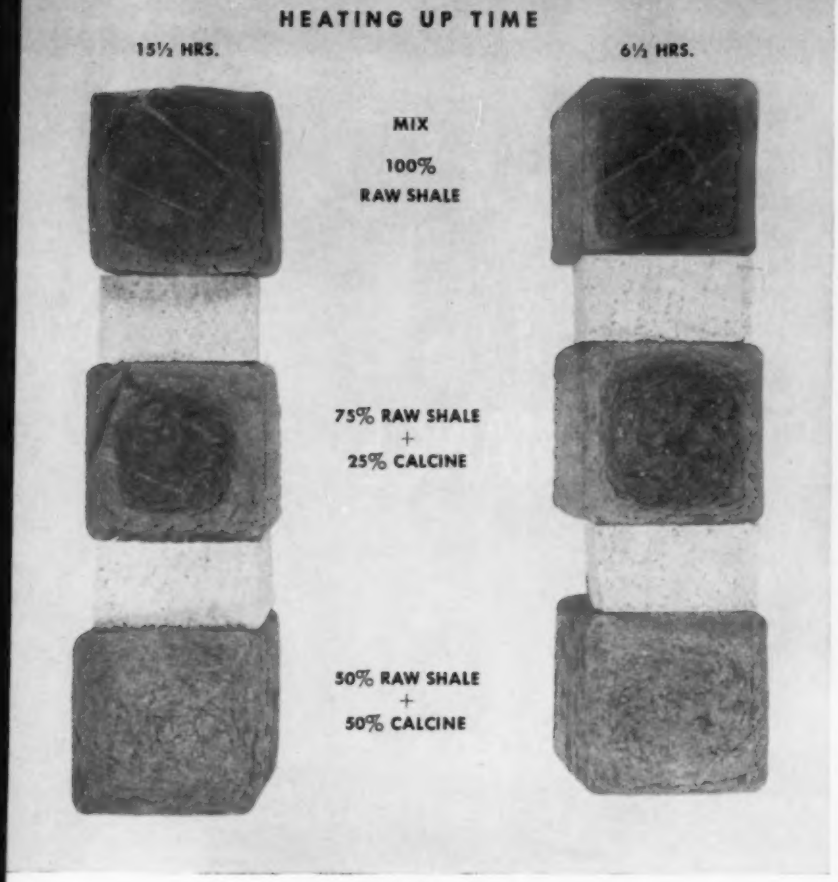


FIG. IV

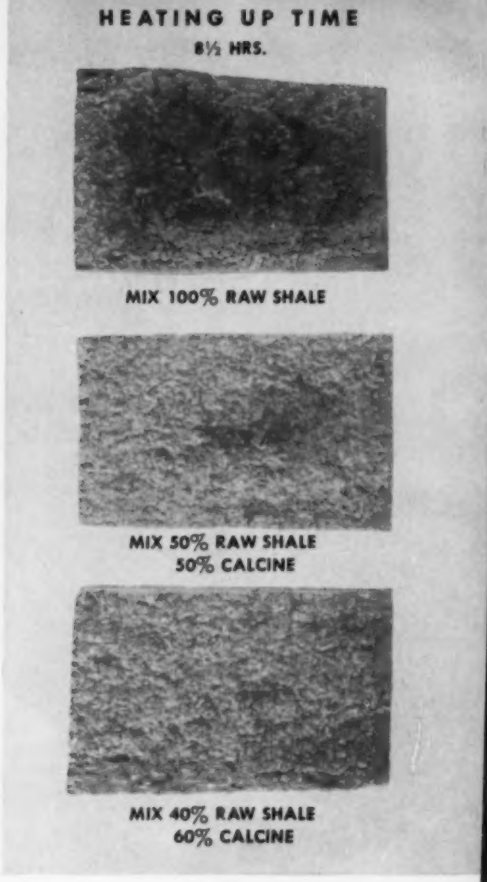


FIG. V

The big difference in speed of oxidation occurs with the 50% calcine content. This, with 15½ hours heating up time, has no core. Even with 6½ hours heating up time, it has no core but a slight discoloration.

Oversized brick 2½" thick were dry pressed, dried and fired to 1870° F. in 8½ hours heating up time. The results are shown in the second photograph (figure V). The raw clay brick had 70% black core. The 50% calcine plus 50% raw shale brick had 7.5% pale colored core, and a 60% calcine plus 40% raw shale brick had just a pink semblance of core.

Absorption on this rapid firing test would mean little. However, checking back to the other tests, there is a 50% decrease in drying shrinkage with the 50% calcine content, also a 33⅓% decrease in firing shrinkage in the 6½ hours heating up to 1850°, although no decrease in firing with the 15½ hours heating up time. The large decrease in drying indicates less drying difficulty, and the relatively small decrease in firing shrinkage indicates there should be little effect on the strength and absorption of the final product. This in most cases is desirable, especially when we are calcining at a low temperature to speed up oxidation during firing. Naturally, if higher absorption were desired, then we would calcine at the commonly used higher temperatures.

In the initial test, we had considerable scumming due to using a high per cent of tempering water and allowing the briquettes to stand 48 hours in the room before placing in the drier.

No scum was present on subsequent tests where proper amount of water was used and the briquettes were put into the drier immediately after tempering.

Conclusion

The addition of 1500° F. calcined shale in the amount of 50%, or equal parts of raw shale and calcined shale, show the same general satisfactory results in oxidation as was shown in the addition of 1400°-1500° calcined fire clay to equal parts of raw fire clay.

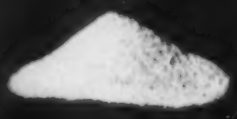
Let us repeat the production advantages of precalcining 50% of the raw material going into heavy clay ware products. All problems now experienced from drying and firing —such as shrinkage faults, unstable setting, shrinkage cracks, slabbing, pinholes, blistering, bloating, warping, black coring, red hearts or staining, popping, scumming and kiln marking — could be eliminated or greatly minimized with precalcined "body" materials.

Faster, safer firing cycles would result. Manufacturers would get much greater kiln production, almost quadrupled in some cases. Larger shapes and more complicated designs could be produced. (All this has been proved in current production of certain refractories, porcelains and steatites.) Initial investment per unit of production would also be lower.

• • •

For further information, contact ALLIED Engineering Division, Ferro Corporation, 4150 East 56th Street, Cleveland 5, Ohio.

Your final product is the only important test of OPACIFIER PERFORMANCE



ZIRCONIUM opacifiers

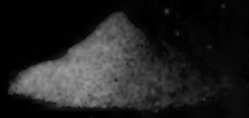
ULTROX® Opacifiers are the unusually uniform, ultra-high opacity zirconium silicates originally developed by M&T. Today there are three grades: ULTROX STANDARD for whites and colors, ULTROX 500W for strong whites and pastels, and ULTROX 1000W for ultra-whites to match enamels.

TIN opacifiers

Three distinctly different M&T tin oxides offer a wide application range in enamel opacifiers, production of ceramic stains and glass colors. They are: M&T TIN OXIDE—LIGHT, M&T TIN OXIDE—SPECIAL WHITE, and M&T TIN OXIDE—PRIME METAL.

ANTIMONY opacifiers

For iron and steel enamels, you have your choice of M&T SODIUM ANTIMONATE and M&T ANTIMONY OXIDE.



TITANIUM opacifiers

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Excellent performance in your glazes or enamels is the single objective of our manufacturing methods, our laboratory testing, and our research and development work. That's why we use so much plant know-how in our test procedures—and that's why we use kiln firing as a definite *practical* check on opacifier performance *before* shipment.

M&T Chemicals

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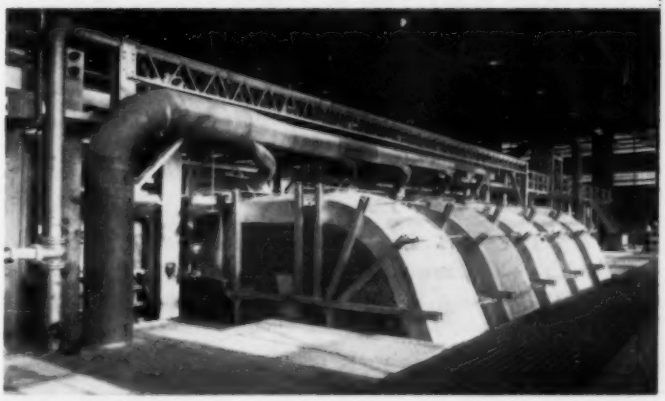
Build Right with
Garfield Refractories

Garfield Refractories are made in many shapes and sizes to fit the requirements of kiln construction and to span temperatures ranging from 1500° F in low temperatures kilns to 2800° F in high temperatures installations.



Garfield Refractories have been selected for glass tan construction because of their ability to operate continuously at high temperatures. Brick as well as special shapes are available.

Garfield Refractories are a standard in porcelain enameling furnaces. They have proven their long service in both continuous and periodic furnaces. The brick are not affected by gases given off.

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GARFIELD REFRACTORIES CO.

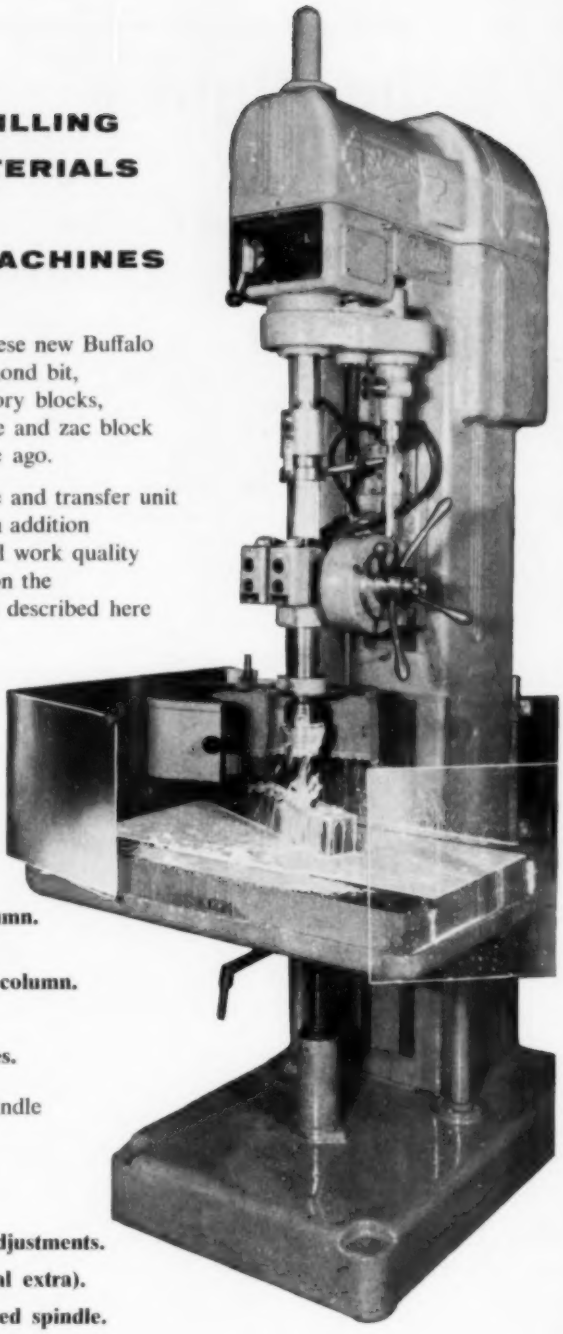
Bolivar, Penna.

Circle Service No. 32

INCREASE PRODUCTION DRILLING OF CERAMIC AND OTHER MATERIALS WITH NEW BUFFALO HOLLOW SPINDLE DRILLING MACHINES

Drill super-hard materials fast and clean with these new Buffalo Hollow Spindle Drilling Machines. Using a hollow diamond bit, you can drill holes in ceramics, fused cast refractory blocks, glass, marble, granite, reinforced concrete and zac block at production speeds thought impossible a short time ago.

These *Buffalo* machines feature a hollow spindle and transfer unit which directs flush-coolant water to the work area. In addition to increased production, bit life is extended and work quality often eliminates need for further finishing. Details on the Buffalo Hollow Spindle Drilling Machines described here can be obtained from your Buffalo Machine Tool Representative or write direct.



Buffalo No. 18 Hollow Spindle Drilling Machine at left features:

- **Large work capacity — drills to center of 18″ circle.**
- **Convenient head adjustment — rack gear integral with column. Table has screw adjustments.**
- **A rugged, heavy-duty 3-15/16″ column.**
- **Speeds to 10,000 RPM.**
- **Available in one to six spindles.**

Buffalo No. 3A R-P-Mster Hollow Spindle Drilling Machine at right features:

- **Instantly variable speeds, 125 to 2,000 RPM.**
- **Convenient controls for all adjustments.**
- **Special splash guards (optional extra).**
- **Extra rigid, accurately balanced spindle.**
- **Available in one to six spindles.**

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BUFFALO, NEW YORK

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Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

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Buffalo Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

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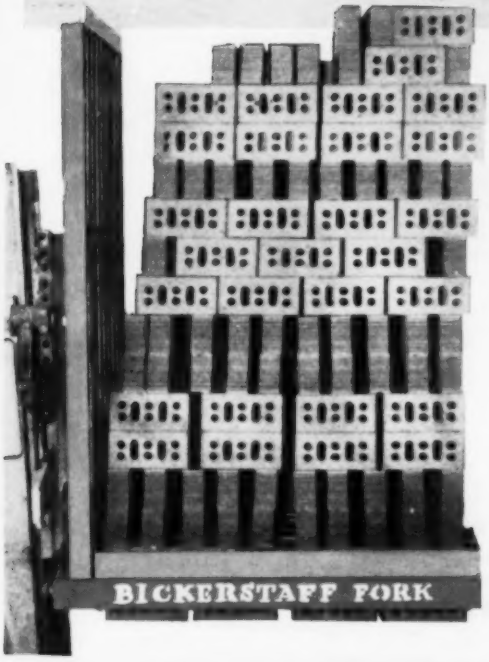

your brick handling is a "cinch" with a Bickerstaff Brick Fork!

It cuts your handling costs to only pennies per package! The Bickerstaff Brick Fork reduces labor costs, waste and breakage to an absolute minimum.

Tests have proven Bickerstaff Brick Forks increase kiln turnover 25% ; reduces kiln loading and unloading time from 72 to 12 man-hours; and, loads directly from kiln to truck, freight car or inventory without rehandling. All these "add-up" to extra profits from every load.

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Circle Service No. 34

Why B&W Insulating Firebrick in Periodic Kilns ?

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- Lowest Thermal Conductivity
- High Fuel Savings
- Faster Cycling
- Uniform Temperatures
- Simplified Construction

Since B&W IFB are lighter than other insulating firebrick, they insulate better. Thus, they save more fuel.

The lighter weight of B&W Insulating Firebrick provides low thermal conductivity and lower heat storage. As a result, the kilns heat and cool more quickly, thereby appreciably increasing production. B&W IFB also aid in reducing rejects by maintaining uniform temperatures within the kiln.

B&W IFB are further suited for use in periodic kilns because their light weight, high hot-load strength and negligible shrinkage permit thinner, less costly wall constructions. In addition, B&W IFB are easier to shape and handle . . . make construction and maintenance simpler.

For information on how lightweight B&W Insulating Firebrick can increase production and cut costs in your kilns, consult your local B&W Refractories Representative or write for Bulletin R-43.

B&W

THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

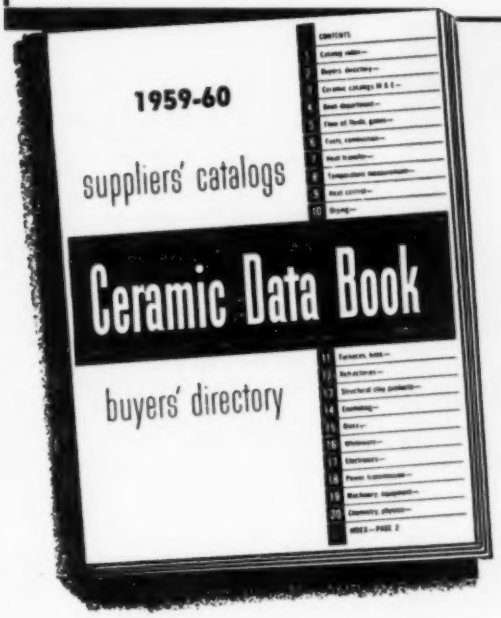
B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber.

Circle Service No. 35

FOR "WHO SELLS WHAT" . .

CONSULT THE 1959-60

Ceramic Data Book



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5 South Wabash Avenue **Chicago 3, Illinois**

The Camera Views the News

WASHINGTON—President Dwight D. Eisenhower was the honored guest speaker at a dinner given on March 10 by the Indiana State Society when it named House Minority Leader Charles A. Halleck "Hoosier of the Year." Douglas Whitlock, Board Chairman of the Structural Clay Products Institute, was chairman of the dinner and the man who escorted the President to the speaker's rostrum. Pictured here at a reception before the award dinner which drew 1,700 people are (left to right) Douglas Whitlock, President Eisenhower, Mrs. Halleck and Congressman Halleck.

CLEVELAND—Region 4, Structural Clay Products Institute, again this year had one of the outstanding exhibits at the Cleveland Home and Flower Show held March 4 through March 13. James R. Platt, Executive Secretary, said the exhibit was particularly productive this year inasmuch as the Region combined forces with the bricklayers in Cleveland and had an extremely large exhibit area with aisles on three sides. Part of the booth was taken up with an arena in which the Cleveland Apprentice Contest was held during the first part of the week. The Ohio State Apprentice Competition was held the last three days of the show.

CINCINNATI—The Facing Tile Institute display at the Mason Contractor's Association of America Convention featured accent colors, packaging and the theme, "There's No Substitute For Genuine Structural Clay Facing Tile." This photo shows John Morton (left), Cushwa Brick Company, Richard G. Capen, FTI field man in Washington, D. C., and Willard Dikeman (second from right)) FTI field man in Chicago with two mason contractors who were visiting the booth.

LEFT: PHOENIX—View of Phoenix Brick's huge lift used to spot cubes on the job at any elevator.

Associated Brick Manufacturers of Southern California

The California Assn. represents 13 out of 14 brick manufacturers from Fresno to San Diego. With the exception of brick veneer, all brick-work in this area is reinforced grouted brick masonry. Heading the Association is Norman W. Kelch, A. I. A., who is Technical Director. He is aided by Alex R. Larker, C. E., Principal Field Engineer. Recent achievements of the Association have included the production of a color sound film which is shown to schools, universities and architects. Other activities include preparation and distribution to the building profession of technical folios, technical bulletins, standard fireplace and chimney details, etc. which are usually distributed to a mailing list of about 1750, exclusive of several hundred state and municipal building officials.

Southern Brick And Tile Manufacturers Association

The Annual Meeting of the Southern Brick and Tile Manufacturers Assn. will be held at The Cloister, Sea Island, Ga., on May 20 and 21. Jack Carney, Arch.-Eng. for the past nine years is leaving the Association to become Executive Director of the Miss.-La. Assn. James A. Lee, Executive Director of the Association, expresses hope that the Northerners keep their weather to themselves since the "Sunny South" had its share of ice, sleet and cold.

Mississippi-Louisiana Brick & Tile Manufacturers Assn.

Jack W. Carney, will become the Executive Secretary of the Assn. effective March 1. Carney is replacing Dean Ramey who has moved to Austin, Texas to become Executive Director of the Clay Products Assn. of the Southwest. Carney is a native of Iowa and has degrees in both Architectural and Civil Engineering. He is a registered professional engineer and has been with the Southern Brick & Tile Manufacturers Assn. for nine years.

The Association reports that business in both States remained good through the end of 1959 with Mississippi conducting about 12% more business than it did at the end of 1958 and Louisiana with a five percent increase. Construction activity has continued at a higher than normal winter rate in both Mississippi and Louisiana and it is expected that there will be an upsurge in building activity in late spring or early summer.

Virginia Brick Association

At a recent meeting of the Virginia Brick Assn., the following officers were elected: President, John B. Rawlings, Brick & Tile Corp.; Vice President, Charles H. Locher III, Locher Brick Co.; Treasurer, Miss E. Louise Vaughan; and Executive Secretary, E. J. Meridith. The Virginia Brick Association operates as a region of SCPI, serving the Commonwealth of Virginia. The Association is active in various promotional activities with architects and others concerned with the specification of brick.

Pennsylvania Brick And Clay Products Association

The Pennsylvania Brick and Clay Products Assn. has merged with SCPI and is now operating in Region 3 for the National Association. Main offices are in Philadelphia with a branch office in Baltimore, Md. Walter M. Whitehill is Director of Promotion for the organization.

Brick And Tile Service, Inc.

Gilbert A. Meland, formerly Chief Engineer for the Clay Products Assn. of the Southwest, joined the engineering staff of Brick And Tile Service effective January 1, according to an announcement from the North Caroline brick industry's headquarters in Greensboro.

Meland, a graduate in architectural engineering from North Dakota State College, was at one time staff engineer for SCPI in Washington, D. C. He also served in various engineering capacities while on duty with the Air Force and brings a broad experience in the construction field to his new duties in the Brick Capital of the Nation.

CRUSHING LIGHT AND ABRASIVE MATERIALS?

Pennsylvania CDL Series Reversible Impactors offer 5 unique advantages

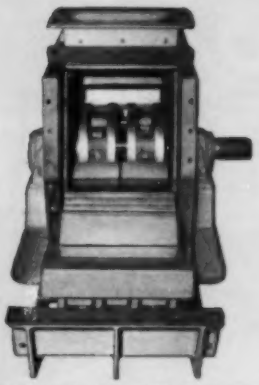
This is the crusher designed specifically for jobs where weight and ruggedness are unnecessary —such as crushing light and often abrasive materials. To plant operators with such job requirements Pennsylvania CDL Series offers:

1. Definite wear advantage accomplished by use of cast alloy steel in all hammers and breaker blocks. Side lines are of heat-treated carbon steel.

2. Adjustable upper and lower breaker blocks. In some series the upper blocks are reversible. Maximum control of circulating load and product gradation is achieved by merely moving upper and lower blocks closer to or further from the hammer circle.

3. Easy accessibility. The entire upper and lower breaker block assembly swings back, exposing the entire rotor assembly, thus holding maintenance time to a minimum.

4. Identical reduction. With breaker blocks located on both sides of the machine, and feed chute directly over center of the rotor, these units perform identical reduction when run in either direction.

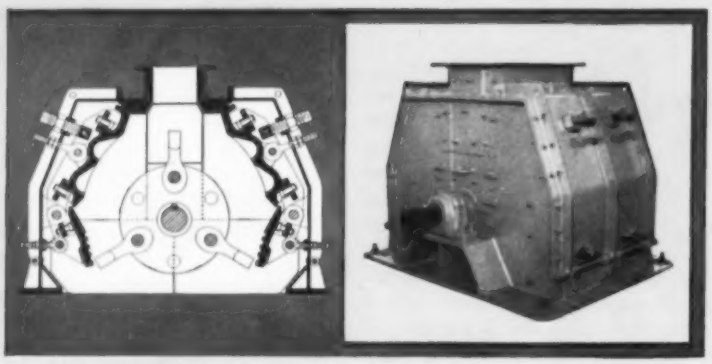


• Pennsylvania CDL 5-32 Reversible Impactor with breaker block assembly open to show easy accessibility.

5. Balanced wear. Systematic rotor reversal balances wear on both sets of breaker blocks and eliminates hand-turning of hammers—a major saving in maintenance costs for both parts and labor.

FREE BULLETIN

For full description of Pennsylvania CDL Series Impactors, as well as other Pennsylvania Reversible Impactors, write for Bulletin 6018.



• Pennsylvania CDL 7-38 Reversible Impactor

PENNSYLVANIA CRUSHER DIVISION
BATH IRON WORKS CORPORATION
WEST CHESTER, PENNA.

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Over 50 years' concentrated experience in all types of material reduction makes Pennsylvania your best source of crushers and engineering advice and service. Call on Pennsylvania with your next crushing problem. Representatives from coast-to-coast.

PENNSYLVANIA CRUSHERS

BATH-BUILT

Circle Service No. 37

A Look at

The Latest in Industry News

Vitro Announces Change

Effective March 1, the Vitro Manufacturing Co., Pittsburgh, division of Vitro Corp. of America became a part of the Color Division of the Ferro Corp.

One reason for this move is that Ferro has long been interested in expanding its color operations to provide a complete service to the *glass* industry here in this country.

Appoint Larson Western Manager at NATCO

Bob Larson has been appointed Western District Manager for NATCO effective March 1, 1960.

He was formerly active as a special representative in the New York office and for the past two years held the title of Assistant General Manager of Sales in Pittsburgh. He holds degrees in Civil Engineering and Business Administration from the University of Minnesota.

New Kiln at Dickey's Ala. Plant

A huge tunel kiln is the first unit scheduled for completion at the new ultra-modern Birmingham-Bessemer, Alabama, plant of W. S. Dickey Clay Mfg. Company, according to Thomas L. Howard, Plant Manager.

Constructed of steel and refractory brick, the kiln will be housed in one wing of an 820-foot building. Green clay pipe, loaded on 12-foot-wide flat cars, will travel slowly along the 575-foot length of the kiln, passing through various heat zones. The kiln is 16 feet wide and up to 16 feet high.

The new kiln was designed to vitrify clay pipe in sizes up to 24 inches in diameter. Future plans call for the construction of a companion unit, Howard said.

Chicago Wheel Installs Automated Ceramic Kiln

Chicago Wheel and Manufacturing Co. recently installed a Lindberg Tunnel Kiln for firing alumina and silicon carbide grinding wheels. The Pusher Slab Tunnel Kiln was designed, engineered and built by Lindberg Engineering Co., Chicago. Fully automatic, the tunnel kiln is electrically heated and assures a highly accurate control of the firing process. In operation, conveyors automatically charge slabs, containing abrasive grinding wheels, to the kiln for the 36 hour-long processing. Each slab is discharged automatically by the main pusher and a new slab is charged automatically.

J. A. Sudduth Appointed Manager of Allis-Chalmers' St. Louis Office

J. A. Sudduth has been appointed manager of the St. Louis district, according to an announcement by the Industries Group of Allis-Chalmers. He succeeds R. E. Morris, who was named Midwest regional manager.

Sudduth had been manager of the company's Grand Rapids (Mich.) district since 1957.

New Plant at Shuqualak, Miss.

A new face brick plant will go into operation about May 1st at Shuqualak, Mississippi under the name of Atlas Tile and Brick Company. L. C. Guillot of Jackson, Mississippi is the President of the new company and Roy C. Kuyrkendall is General Manager.

The plant has been built under the direction of Frank Collins, Plant Superintendent and was designed and engineered by F. P. Henderson of Tyler, Texas. The initial production of the 450′ Allied kiln and drier will be 50,000 brick per day. Using local clays, a line of textured face brick in buff and light colors will be offered.

Texas Clay Expanding

A $60,000 expansion program is shaping up at Texas Clay Products, Malakoff, Texas. This involves the installation of a new grinding and screening unit for #1 Machine which has been designed and executed by F. B. Henderson of Tyler, Texas. New feeders, conveyors, screens, and storage have been combined to give more grinding and better mixing and blending.

The plant is under the direction of Herbert Gatlin, Sr., Manager and C. C. Lake, Supt.

Holly Springs Adds 3rd Kiln

A third tunnel kiln has just been completed at Holly Springs Brick and Tile Co., Holly Springs, Mississippi. Under the direction of Charles Laird, General Manager and John Dunlop, Superintendent, this 410′ Allied kiln and drier will soon be producing 45,000 brick per day. The product is a high grade buff face brick.

Conax Names Jones

Conax Corporation, Buffalo, N. Y. manufacturer of high pressure thermocouple assemblies and explosive actuated valves, announces the appointment of Warren L. Jones to the newly created position of Sales Manager, Industrial Products. In this capacity, Jones will coordinate the growing national sales activities of this division.

Grant Okla. Co. Charter

C & C Tile Co. Inc., Tulsa, Okla. has been granted a charter. Capital stock: $100,000. 50 years existence. Incorporators: Charles W. Powell, Roy H. Radke and Nancy Powell, Tulsa.

Gross Named to New Duties at SCPI

James G. Gross has been named Assistant Director of Engineering and Technology for the Structural Clay Products Institute, national association of brick, structural tile and architectural terra cotta makers. He replaces Clayford T. Grimm, who is now with the Zonolite Company in Chicago. Harry C. Plummer is Director of Engineering and Technology.

Acme Announces Changes

Marshall L. Vaughan, formerly associated with the Muskogee Piston Ring Co., has been named industrial relations director for Acme Brick Co. in Tulsa, Okla. Acme has a sales office and plant in Tulsa.

Joe P. Hobson, Director of Plants, announced the appointment of W. H. Holmes to be plant superintendent of the Kanopolis, Kans., plant. Holmes started with Acme at the Perla plant in 1927. He has been manufacturing foreman at Perla for some time.

Aldon P. Annis will assume the duties of division ceramic engineer in the Arkansas Division. He is a graduate of the Missouri School of Mines, and worked for Texas Vitrified Pipe Co. and for the Great Bend Brick and Tile Co. He has been superintendent of the Kanopolis plant.

Glenn Powers has been named Division Construction Engineer for the Oklahoma-Kansas district. Powers majored in Ceramic Engineering at the University of Texas. He has been brought up in the clay products industry as his father owned the Abilene Brick Co. which his brother, Paul, now operates.

Other changes are the promotion of Asa Goodman to be manufacturing foreman at the Perla plant. Goodman has been machine shop foreman, and has an important part in building plant equipment. James Cooper, electrical foreman, will take over the duties of shop foreman.

Elect J. C. Hagler, Jr. Chairman of the Board

John C. Hagler Jr. was recently elected chairman of the board of directors and general manager of the Georgia-Carolina Brick and Tile Co. at the annual meeting of the company's directors on March 4.

Eugene M. Long, formerly president and treasurer, succeeded Hagler as president. He also remains as treasurer.

Charles C. Chesser, former vice president, was promoted to executive vice president.

Other officers of the company are: William G. Bush, vice president and secretary; T. O. Atwood, assistant secretary and treasurer.

Comprising the board of directors are Hagler, Long, Bush, James T. Beeson and Sherman Drawdy.

Fire Hits W. Va. Brick Co.

An over-heated stove sent flames racing throught a portion of the big West Virginia Brick Co. at Elk Two Mile recently, producing damage estimated at $175,000.

Leveled were a 320 foot long warehouse, a railroad loading dock, the plant office, two railroad boxcars, an 1,800 foot long conveyor belt and a shed covering it, and a mine tipple on the hill above the brick company.

City firemen said the blaze broke out about 3:30 a.m. and was discovered about 20 minutes later.

The flames quickly spread from the plant office to the warehouse and the conveyor belt.

"The flames shot up that belt just like smoke up a chimney and splashed against the mine tipple where clay is mined for brick company furnaces," a fireman said.

The towering flames could be observed for miles around.

The brick company loss temporarily put at least 70 employees out of work.

Claude Wiseman, president of the company, was quoted as saying that he did not know how long the company would be shut down.

He added, however, that rebuilding would begin as soon as possible.

Joins Chas. Taylor & Sons

James M. Lange, formerly refractory engineer for Bethlehem Steel Co., has joined Chas. Taylor Sons Co., refractories manufacturer, as sales development engineer.

State's Supply Good for 30 Years

Colorado has at least a 30 year supply of refractory clay used in the manufacture of fire bricks which can withstand temperatures between 2,400 and 3,200 degrees.

Joel N. Van Sant, an engineer with the U. S. Bureau of Mines in Denver, estimated that present known reserves stand at about eight million tons, with 250,000 tons used annually.

However, a local user of the material said this is probably a conservative estimate. John L. MacFarlane, president and general manager of Standard Fire Brick Co., Pueblo, Colo., said the estimate probably refers only to known reserves and that more exists but has not been located yet.

A. G. Cochran Re-Named President by Clay Sewer Pipe Association

Member manufacturers of the Clay Sewer Pipe Assn., Columbus, Ohio, have re-elected A. G. Cochran of Columbus, president.

Hudson Hillyer of the Clay City Pipe Co., Uhrichsville, Ohio, was named V.P., and Mrs. Reva D. Smart of Columbus, was re-elected secretary-treasurer.

Directors elected to serve in 1960 are T. E. Duffy, the Stillwater Clay Products Co., Cleveland, Ohio; Thomas J. Evans, III, the Evans Pipe Co., Uhrichsville, Ohio; Hudson Hillyer, the Clay City Pipe Co., Uhrichsville; Barton A. Holl, the Logan Clay Products Co., Logan, Ohio; E. W. McClave, Superior Clay Corp., Uhrichsville; and W. E. Robinson, the Robinson Clay Product Co., Akron, Ohio.

TV Station Spotlights Brick Industry

WFMY-TV, Greensboro, N. C. spotlighted the brick industry in its recent advertisement in a national publication. The ad pointed out that the South's vast brick industry, located in the heart of the industrial Piedmont is one of the dominent selling influences in the 3-billion dollar market.

Ceramic Color Divison Formed By Warlick Paint Co.

The Warlick Paint Co., Statesville, N. C. recently announced the formation of it's "Colortex" division to manufacture ceramic colors. According to W. C. Warlick, "Colortex" is the brand name for the brick coloring developed by H. B. Foster, of Brick & Tile Service, Inc. of Greensboro, N. C. The color is currently being used by several local brick companies as well and a Canadian Company.

Bricklayers Needed

North Carolina needs 1,000 new bricklayers—the nation 166,000—in view of expanding production and construction. This was the long range view expressed at a meeting of North Carolina brick and tile salesmen, sponsored recently by Brick & Tile Service, the promotional agency for the North Carolina Brick Industry.

Honor Frank C. Steimke

Frank C. Steimke, Vice President of manufacturing and research, Walsh Refractories Corporation, St. Louis, was initiated as an honorary member of the University of Illinois chapter of Keramos, professional ceramics fraternity, at a meeting in the Illini Union Building on March 2. Steimke was the principal speaker at a banquet following the initiation. His topic was "The Utilization of Refractories by the Glass Industry."

Steimke received the degree of bachelor of science in Ceramic Engineering from Missouri School of Mines, Rolla, in 1941. He is a member of the American Ceramic Society, and the National Institute of Ceramic Engineers.

NICE Annual Meeting Speakers Named

Two outstanding speakers have been obtained to address the Annual Meeting of the National Institute of Ceramic Engineers at the Bellevue-Stratford Hotel in Philadelphia, Sunday afternoon, April 24.

Patrick M. Dowling, well-known economist and manager of the New York office of Stanford Research Institute, will discuss the "Industrial Implications of Changes Occurring in World and Domestic Economics." His talk will be nontechnical in nature, but will take into account technological change and economic developments and trends as they affect the future of our industry.

The second speaker is *Fred B. Ortman,* Institute member and Fellow of the American Ceramic Society, former President and Chairman of the Board of Gladding, McBean and Company. He has taken an active interest in professional developments of ceramic engineers and their training for management. His talk is titled "Educational Prerequisites for the Present Day Engr. & Citizen."

Fred B. Ortman

Obituaries

Walter W. Posey

Walter W. Posey, president of the Posey Iron Works, Inc. Lancaster Pa. on March 11th.

S. J. "Jack" Galvin

S. J. "Jack" Galvin president and general manager of the Sheffield Brick & Tile Co. Sheffield, Ia. on March 28th.

Lyle Whitesell

Lyle Whitesell, Vice Pesident of Wellsville Firebrick Co., Wellsville, Mo. March 30. Whitesell was well-known throughout the refractories industry. A member of The Refractories Institute, he built the Wellsville plant in Mo. and just three years ago, completely modernized the plant, making it one of the most modern in the industry.

Ludowici Caledon, Chicago, Ill. roofing tile manufacturer, supplied the roofing tile for this house which is the setting for the Columbia Picture "Strangers When We Met". The insert shows Miss Kim Novak, one of the stars, with Col. Charles L. McGee, vice president of the tile company. The picture also stars Kirk Douglas and Ernie Kovacs.

Lyle Whitesell

Minute Money Makers

A practical and quick description of some ideas that may save you much needed time in your operation.

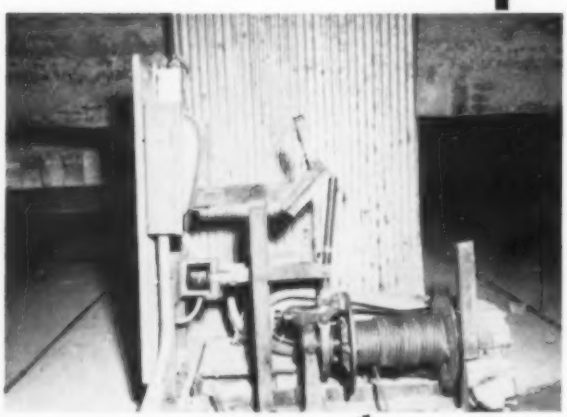
BRICK & CLAY will pay $10 for each Minute Money Maker published. Send yours to B&CR, 5 S. Wabash Ave., Chicago 3, Ill.

Palletizing "Pack-Hauler" Cubes Saves Storage Space, and Trucks

Not everyone has an old 15,000 lb. lift truck floating around their yard, but here's how one was utilized to advantage and at the same time improved the company's operations, by saving storage space and releasing a truck for deliveries. Before "pack-hauler" cubes were palletized, it was necessary to use a truck to move the packs from the hacking area to storage. Champion Brick Co., Baltimore, solved the storage problem, by using their old Hyster truck to move the cubes on pallets. Advantages are obvious; packs can be stored two-high, the yard truck is released for delivery purposes, and the pack maintains its original condition while being transported to storage.

Kiln Car Winch Can Be Controlled from Anywhere in Building

Moving loaded or empty kilns cars from the fired storage area is time consuming, especially when the production from three tunnel kilns has to be moved. To enable this to be a one man operation, a winch was made at Atlanta (Ga.) Brick & Tile Co., permitted one man to hook up the car, and operate the motor without walking to the electrical panel. Ropes were suspended at convenient locations throughout the area and by pulling the rope, the operator actuates a bar which trips the limit switch and engages the clutch on the winch. By releasing the rope, the lever is released from the limit switch, shutting off the motor, and the lever disengages the clutch, allowing the operator to return the cable to another line of cars.



Use Slush Pot

Barium carbonate can be fed to the pug mill as a slurry by using a slush pot similar to the fixture found next to any dentist's chair. Barium is fed to the swirling water with any dry feeder and then piped down to the pug mill. The wet feed will break up any small lumps and assure maximum distribution and effectiveness of the barium carbonate.

Plastic Bags for Clay Samples

Plastic bags, similar to refrigerator freezer bags, make excellent containers for clay samples or other materials. Dry materials can be kept dry and wet materials kept wet indefinitely with no danger of the bag rotting and spilling on the storage shelf. Since the bags are transparent, identification tags may be placed inside the bag where they will not be turn off and lost. Moist materials in plastic bags may be shipped in cardboard boxes which normally could not stand the moisture.

Suspended Sand Shaker

Sanding between courses of brick or tile can be handled efficiently with a simple sand shaker suspended above the dryer or kiln cars. The device operates like a flour sifter with the crank within easy reach above the hackers head. The sand is kept moist to prevent it from leaking through the screen.

This system is especially useful for sanding between flat set courses of brick where sanding devices mounted on the clay column will not do the job.

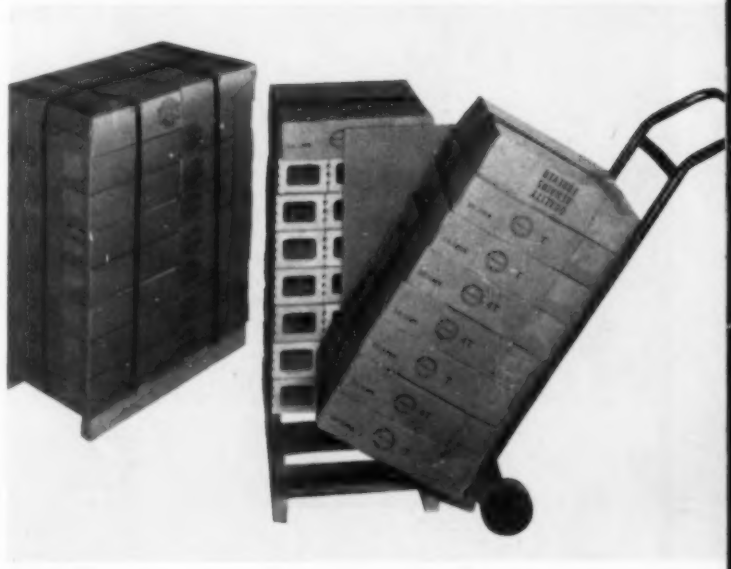
Facing Tile Institute Adopts New Tile Package

The Facing Tile Institute has adopted a new type tile package. Officially designated the "FTI 3-way Tile Pack", the package was developed by the Technical Committee of the Facing Tile Institute and the Structural Clay Products Research Foundation. The package is based on the standard 24 X 32 inch package module recommended by the Mason Contractors Association of America.

The "FTI 3-way Tile Pack" can be handled as a large package 24 X 32 inches in size, or by cutting one strap and two cardboard corner protectors it can be subdivided into two 16 X 24 inch packages, all on disposable, non-returnable wood pallets. Each half package can be further broken down into two or three smaller units capable of being handled individually with two-wheel hand trucks. This flexibility of subdividing the large 24 X 32 inch package into smaller units means that the package can be handled in the most efficient manner for various job conditions and by contractors with all types of material handling equpiment.

The "FTI 3-way Tile Pack" works with 4D, 6T and 8W four-inch stretchers or two-inch soaps. Trays of such units are assembled in such a manner that all surfaces of each tile unit are protected from contact with each other and against damage between packages in shipment.

The full "FTI 3-way Tile Pack" contains 288 4D soaps, or 144 4D four-inch stretchers; 192 6T soaps or 96 6T four-inch stretchers; 96 8W soaps or 48 8W four-inch stretchers.



New Association In Connecticut

Newly-developed service activities, to assist the building trades, promotion of all phases of brick application, is planned by the Brick Service & Development Association, Inc. of Connecticut.

The announcement of the formation of the new state organization, first of its kind in New England, was made by M. Joseph Kane, the first president, and also president of the Michael Kane Brick Company, of Middletown.

Other officers of the association are George N. Tolman, Jr. secretary, and sales manager, Stiles Corporation, North Haven, and Stephen Donnelly, treasurer, a director of the Donnelly Brick Company, New Britain. Messrs. Kane and Tolman, along with Henry H. Rose, vice-president, Donnelly Brick Co., and Samuel M. Ferguson, president of the Kelsey Ferguson Brick Co., South Windsor, comprise the board of management.

Kane also announced the appointment of William H. Bliss, North Haven, as executive director of the new organization.

STAR Foundry & Machine Co., Inc.

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★ ENGINEERS ★ DESIGNERS ★ BUILDERS ★

Engineering Service
Special Machines
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Sewer Pipe - Deairing Feeders
Transfer Cars
Electrified Vibrating Screens
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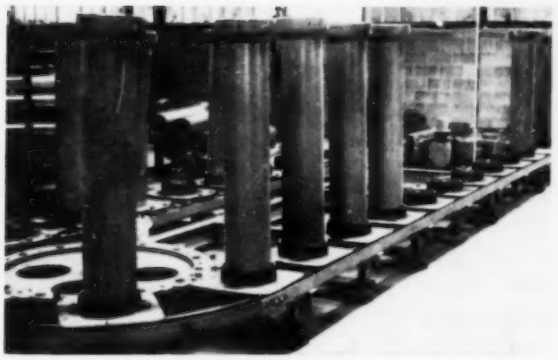
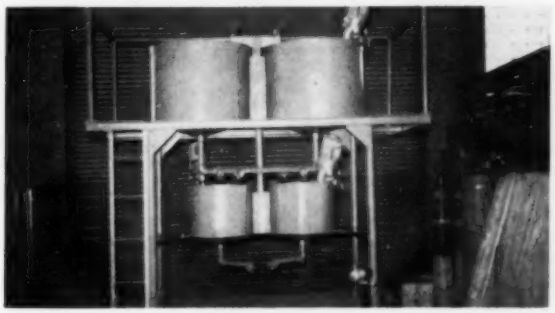
Gray Iron Castings
Car Moving Systems





SEWER PIPE JOINTING EQUIPMENT FOR SLIP SEAL OR POLYESTER JOINTS

Precasting Conveyor for 4" through 12" pipe—up to 2,200 4" or 6" pipe per shift; 1,500 8" pipe per shift. Productivity over stationary method up to 3 times the number of pipe per man hour.

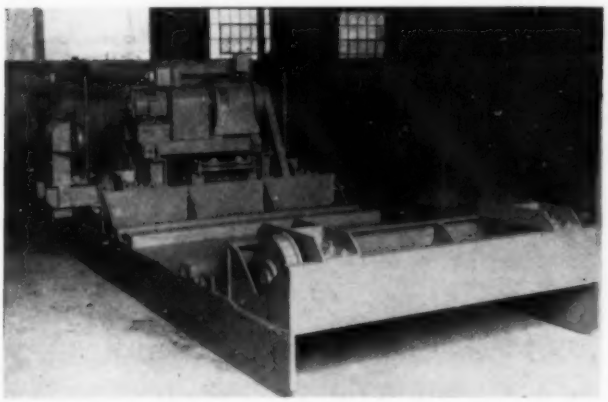
Polyester Conveyor for 4" through 12" pipe—1,000 8" pipe per shift typical capacity. Illustration above left shows 8"—4' pipe on conveyor.

Slip Seal Dies—4" through 36" sizes. Polyester Joint Dies 4" through 24". Dies per standard or special specifications.

Precasting Heating Vat—natural gas, L.P., or oil from 9 cu. ft. to 16 cu. ft. and 25 cu. ft. sizes. 16 cu. ft. size will deliver up to 4,500# properly heated asphalt per shift.

Polyester Batching System—complete with mixers, pump, and mixing gun. Tanks and piping arranged for ease of operation and cleaning. See illustration above right.

Miscellaneous accessories such as pipe racks, hoists, monorails, cranes, clamps, etc., are available for specific installations.



TRANSFER CARS

Star transfer cars are designed and built for hauling kiln cars weighing up to 75,000#. They are available in pitless or pit type models. The propel drive can be arranged for fluid coupling, hydraulic motor or D.C. motor components. For ease of kiln car handling, Star transfers can be furnished with winch and sheave assemblies, telescoping hydraulic car propellers or side cars.

Pitless transfer car with winch, folding outrigger sheave and fluid drive propel arrangement shown.

SCREENS

Star "Electrified" Vibrating Screens are available in 3' x 5', 4' x 6' and 5' x 6' sizes arranged in single or multiple widths and single or multiple decks.

Efficient screening of dry or damp materials is assured. Electric vibrators give proper cloth vibration and adaptable electric cloth heating unit will serve steel and stainless steel cloths. Applications in clay, limestone etc., 4 through 40 mesh.

Heating kits and vibrating kits are also available for existing screen installations.

Twin 5' x 6' double deck unit is shown in illustration at right or above.

For further details, specific recommendations, quotations or discussion of equipment requirements, write or phone

STAR Foundry & Machine Co., Inc.

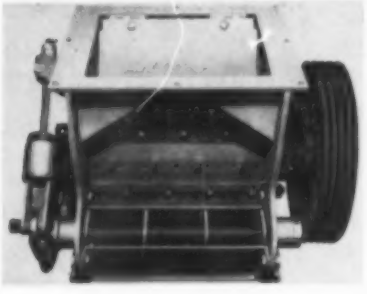
NEW LEXINGTON, OHIO • PHONE FIreside 2-2377

Circle Service No. 38

NEW PRODUCTS

Triumph Crusher

The Triumph single-roll crusher is for reducing any friable material, even if the material is mixed with noncrushable matter. It is ideal for breaking up any material which has a tendency to cake or become en-



crusted in processing. Tramp metal, rocks, stones, etc., pass right through without damaging the machine or slowing it down. Because noncrushable foreign material can pass through the Triumph crusher, it can be used in many places.

C. O. Bartlett & Snow Co.

Circle Service No. 40

G-138 Engine

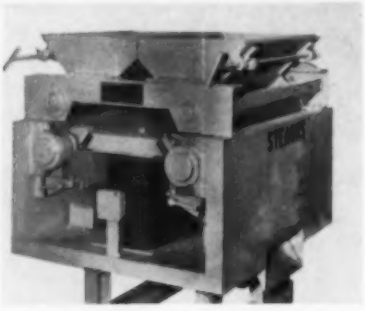
G-138, a 4-cycle, 4 cylinder, 138-cu. in. piston displacement unit that developes 39 bhp at 1800 rpm. The engine is a companion to the G-149 and G-226 engines. The G-138 power unit is 46 in. long, 18-15/16 in. wide, and 30-½ in. high to top of the radiator, making it a compact unit, ideally suited to serve many and varied fields where up to 39 hp is required. The engine weighs 402 pounds and the power unit 622 pounds.

Allis Chalmers

Circle Service No. 41

Induced Magnetic Separator

Type KT single-roll induced magnetic separator. Designed to offer low-cost single-roll performance equal to conventional multiple-roll units. Available in roll widths up to 30" in either single or twin (shown) styles.



Stearns Magnetic Products

Circle Service No. 42

Rerated NEMA Frame Motors

Redesigned to meet new NEMA specifications, Lima Type RS drip-proof general purpose motors feature fully seasoned cast iron frames with integrally cast feet to assure the highest degree of ridigity in mounting without stator distortion. These drip-proof motors are available in ratings from 1 to 150 hp; frame sizes 182 through 505.

Lima Electric Motor Co.

Circle Service No. 43

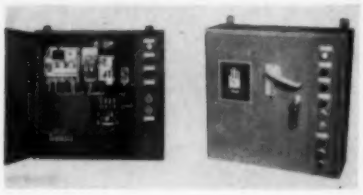
Bronze-Bushed Pillow Block

Bronze precision liners can be replaced quickly and easily in pillow blocks of a new design.

Sleeve bearings are recommended for applications where shock loads, elevated temperature and corrosive conditions are anticipated. For the first time, according to Dodge engineers, it is possible to replace a worn bushing, or liner, without removing the bottom half of the housing from its support. Only the cap of the block is removed . . . the shaft is lifted just enough to permit the lower half of the liner to be loosened and slipped out. A new bronze liner can then be inserted and seated by tapping lightly.

Dodge Mfg. Corp.

Circle Service No. 44



"Packaged" Control Panels

A series of "packaged" PROTECTAL control panels for automatic start, stop and complete combustion supervision of gas-fired ovens, furnaces, boilers, various heating and heat-treating systems.

This method of "packaging" standard components and assemblies into an integrated panel provides centralized control and complete safety at lower cost because a wide range of single or multi-burner heating installations can be accommodated without additional engineering.

Protection Controls, Inc.

Circle Service No. 45

Utility Backhoe-Loader

Trenching and excavating down to 14', and backfilling, grading, and loading-out 2000-lb. bucketloads of spoil and other bulk materials is the capability of 1960, 47 hp Model 530 Utility Backhoe-Loader. Backhoe cuts 14' deep, digs 16' 9" from pivot, piles dirt or loads your highest dump truck. Foot-pedal 180° hydraulic swing saves hand-motions, adds dig-

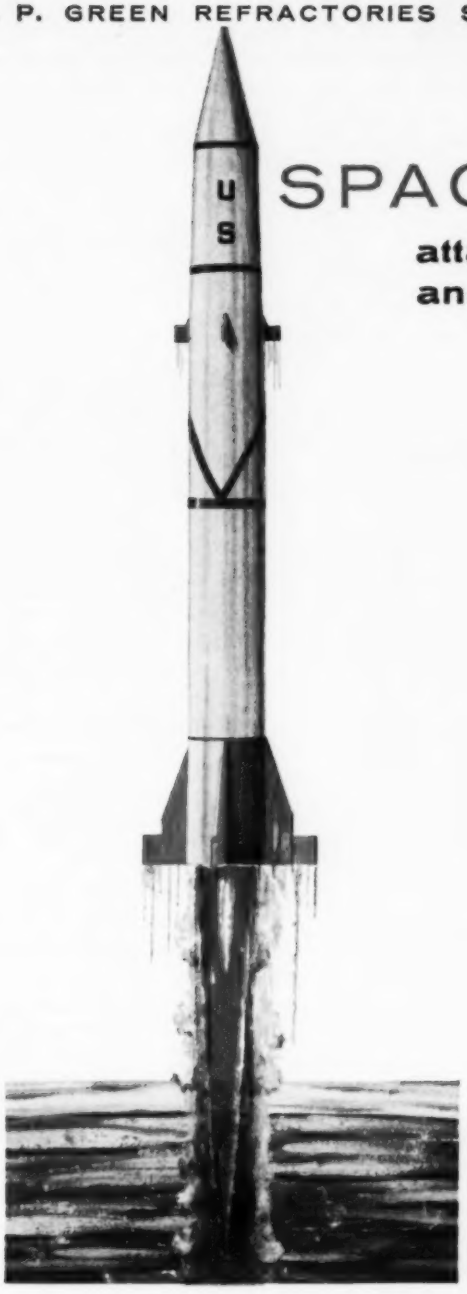
dump speed and accuracy. Loader bucket heaps easily, lifts quickly to dump clean with over 9' clearance for fast dump-and-go. Interchangeable loader attachments include pallet fork, log fork, crane boom and dozer for wide range of material handling chores.

J. I. Case

Circle Service No. 46

Turn to page 44

A. P. GREEN REFRACTORIES SERVE THE WORLD'S INDUSTRIES



SPACE...

attained through imagination and refractories

When the original Redstone missile soared aloft at the Cape Canaveral launching site, mankind took a big step toward the reality of interplanetary travel, weather forecasting, and other dreamlike by-products of the space age. A. P. Green Company engineers were associated with the missile program from its early beginning. Their job — to develop heat resistant refractory materials to withstand the extreme temperatures and thrust encountered in the testing of today's missiles. The refractory surfacing of the test launching pads at Cape Canaveral is an A. P. Green development . . . the original pads are still giving excellent service.

This is a photograph of the A. P. Green KS-4 castable refractory used for surfacing the launching pads in the original test. It illustrates the gunned castable refractory panels as installed on the pad foundation. This special refractory was required to withstand the tremendous heat and thrust encountered in the firing of missiles such as the Redstone.

50
FIFTY YEARS OF PROGRESS
A. P. GREEN FIRE BRICK CO.

A. P. GREEN
FIRE BRICK COMPANY
MEXICO, MISSOURI U.S.A.

MANUFACTURERS OF A COMPLETE LINE OF HIGH QUALITY REFRACTORIES INCLUDING: FIRE CLAY, HIGH ALUMINA, SEMI-SILICA, SILICA, MULLITE, SILICON CARBIDE, ZIRCON, AND BASIC PRODUCTS.

Circle Service No. 67

One Piece Pneumatic Rappers

For electrostatic precipitators and dust collectors,

"Rappers" are made with a patented one-piece design that eliminates 80% of the maintenance problems on precipitators and dust collectors. Rappers have no assembly bolts, or separate striking plate.

Exhaust parts on both sides of the housing keep the vibrator piston centered, so housing wear is eliminated.

National Air Vibrator Co.

Circle Service No. 47

Two 22,000 lb. Models

G-5 truck is rated at 22,000 pound capacity at a 24 inch load center. Comparable in compact size with the 20,000 pound capacity model, it is used in handling conventional, very heavy loads. Overall length is just 125¼ inches from the face of the fork carriage to the rear of the counterweight. The second model is rated at 22,000 pounds at a 27-inch load center.

Yale & Towne Mfg. Co.

Circle Service No. 48

#123 Front End Loader

This 74" gauge machine has a bucket capacity of 20,000 lbs. at carry position and maximum breakout force with the bucket heeled on the ground, of 25,000 lbs. The sand and gravel bucket capacity has an SAE rating of 2¼ cu. yards; the rock bucket a 2 cu yard capacity and 2¼ yards heaped capacity.

Eimco Corp.

Circle Service No. 49

the name is ...

OVERSTROM

For *simplicity, endurance,* and *ease-of-maintenance* in vibrating screens, look for the name *OVERSTROM* . . . Example — take the unitized vibrator cartridge assembly. It can be removed and replaced in *twenty minutes!* (Rebuilt-exchange units can be shipped from O&S on a moment's notice) . . . Take the flywheels — steel castings machined for *perfect balance,* counterweights tucked under the rim for *added safety* . . . Take the sealed oil-bath lubricated cartridge design — *bearings are protected* against dirt and moisture damage; *no more daily greasing routine* . . . Take the rugged mine rail cloth supports, with broad neoprene rubber cushions *locked tighter to outwear all others* . . . All these features and even more, *plus top screening efficiency.* (Write for 8-page catalog.)

OVERSTROM VIBRATING SCREENS

OVERSTROM & SONS, INC • 2213 West Mission Rd • Alhambra, California

Circle Service No. 68

"CX" V-Belt

Fully molded, fully jacketed notched V-belt, which the manufacturer claims is the only construction of its kind in industry. The primary advantages claimed for this entirely new belt are quiet, vibrationless running characteristics, ruggedness and greater flexibility, permitting it to run smoothly over smaller pulleys. The fully molded and fully jacketed construction eliminates flex-cracking, and greatly increases fatigue resistance.

Raybestos-Manhattan, Inc.

Circle Service No. 50

Hydraulic Cutter

Hydraulic Cutter employs hydraulic power to handle with ease all of the capabilities of the Wheeler Manual Cutter in addition to 8" standard and extra-heavy soil pipe as well as 2" and 3" cast iron water main.

It is ideal for use in close quarters and on over-head installations.

Wheeler Co.

Circle Service No. 51

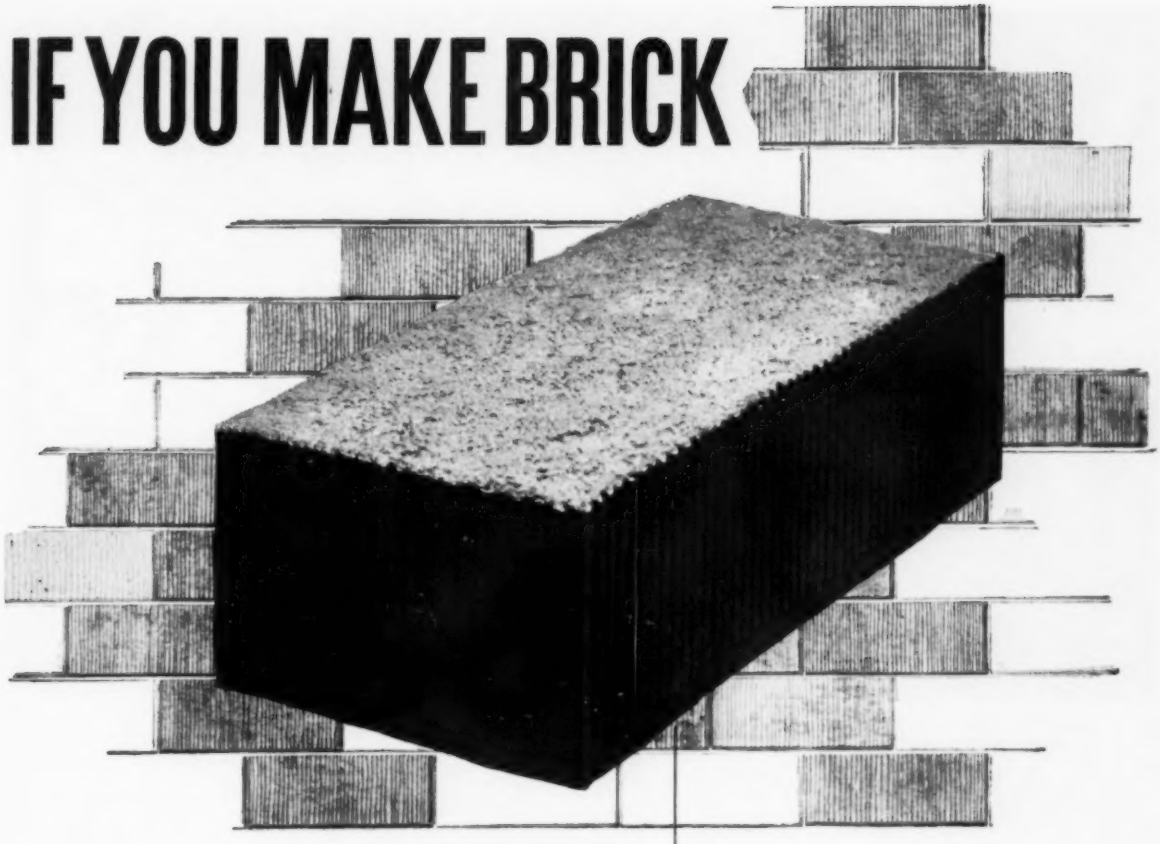
Flexible Unloader

Unloader offers three-dimensional flexibility. The 17-foot boom travels forward or backward and will rotate continuously in either direction, and the load is raised or lowered. Operations may be performed simultaneously or independently. Separate relays for each operation eliminate arcing and assure trouble-free switch performance.

Side-O-Matic Unloader Corp.

Circle Service No. 52

IF YOU MAKE BRICK



we can show you how to COLOR it!

Until recently, brick coloring was largely confined to the use of colored glazes, yet relatively few manufacturers could fit glazing into their brick-making processes. As demand increased for more and more color on brick, we developed economical coloring methods which all face brick manufacturers can use. Colored engobes and colored sands are a direct result of our research, so Drakenfeld can now offer a coloring material to suit almost any brick processing setup.

Whatever your plans for producing colored brick, an experienced team of Drakenfeld color ceramists will gladly assist you with prompt, dependable solutions to your coloring problems. We cordially invite your inquiry.

SAND COLORS: If you use a sand mold, sand blast, or any kind of sand finishing operation, Drakenfeld has a complete palette of colors for you. They are colors you merely mix with your sand and apply by your normal sand coating technique. No change in processing—no special processsing required. The cost is low.

ENGOBE STAINS: Engobes can provide a permanent colored surface for your brick at low cost. Engobe formulas available on request. The mixes are easy to prepare.

GLAZE STAINS: Strong yellows, clean pinks, stable blue-green and grays. A complete line of quality stains . . . laboratory controlled to insure maximum workability and uniformity.

GLAZE SPECKS: Years of leadership in speck production enable us to recommend the best speck for your needs, sized to exacting specifications.

PREPARED GLAZES: For brick manufacturers who wish to produce limited quantities of glazed brick without investing heavily in glaze preparation equipment. These glazes are supplied completely ground and ready to mix with water. Wide range of brick and pastel colors are available.

CALL ON Drakenfeld

OUR PARTNER IN SOLVING COLOR PROBLEMS

B. F. DRAKENFELD & CO., INC.

Executive Offices: **45 Park Place, New York 7, N. Y.**

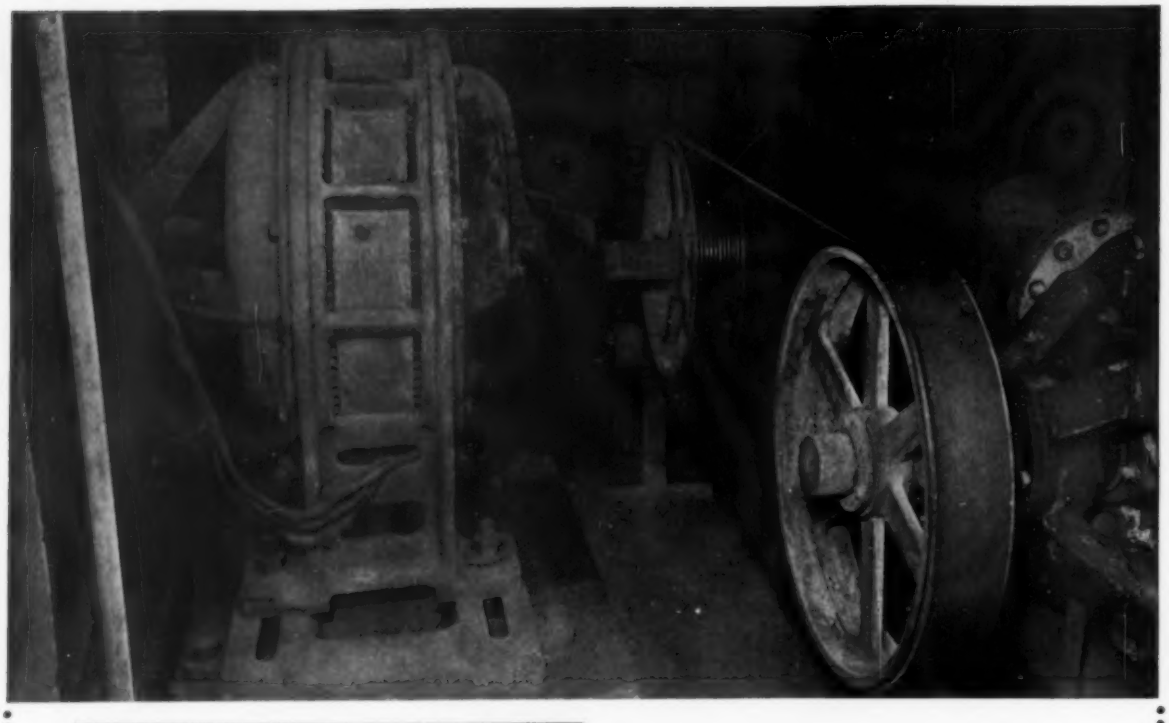
Factory and Research Center: **Washington, Pa.**

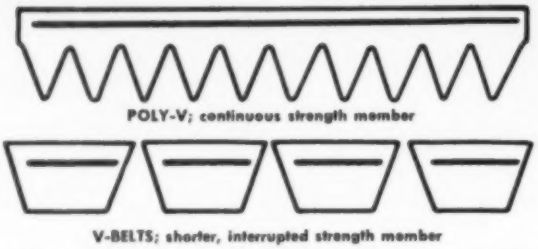
Pacific Coast Agents:

BRAUN CHEMICAL COMPANY, 1363 So. Bonnie Beach Place
LOS ANGELES 54, California Phone: ANgelus 9-9311

BRAUN-KNECHT-HEIMANN COMPANY, 1400 Sixteenth Street
SAN FRANCISCO 19, California Phone: HEmlock 1-8800

Circle Service No. 36





"MORE USE PER DOLLAR"

Poly-V Belt is a single unit with even, uniform pull. Uninterrupted strength member gives much higher hp capacity per inch of drive width. No belt drive delivers as much power in the same space as Poly-V!

THIS R/M POLY-V® DRIVE OUTLASTED V-BELTS 8-1!

V-belts were replaced every six months on this gas pump drive in a southern chemical plant—until the company converted to R/M's patented Poly-V Drive. The single Poly-V Belt pictured above has been in operation for over 4 years on a barium process operation. Four years for the R/M Poly-V Drive versus 6 months for an ordinary V-belt drive! The savings and advantages to production are obvious.

R/M Poly-V Drive solves difficult drive problems wherever heavy duty power transmission is required. Single unit design permits *narrower* Poly-V sheaves to deliver *equal* power in a much smaller space or much *more* power in the same space as a V-belt drive! The drive runs smoother because there's no sinking of belt in sheave grooves. Belt speed ratios remain constant from *no* load to *full* load for uniform power delivery—with less wear on belts and sheaves. V-belt "length matching" problems are completely eliminated . . . and just two belt cross sections meet every heavy duty requirement. Let an R/M Distributor show you other advantages of converting to R/M Poly-V Drive. Write for Bulletin M141.

- **More Power—Less Space**
- **Eliminates "Matching" Problems**
- **Maintains Groove Shape**
- **Assures Constant Speed Ratios**
- **Longer Belt and Sheave Life**
- **Cooler, Smoother Running**

MM1010

When You Change Drives, Convert to Poly-V and Be Sure!

RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

RM

ENGINEERED RUBBER PRODUCTS ... MORE USE PER DOLLAR

Circle Service No. 69

TORONTO DOES THE ENTIRE JOB FOR THE CLAY INDUSTRY!

ENGINEERS

Plant Design
Machine Design
Machine Building
Equipment Modernizing
Special Machinery
Repair Parts Service
For All Makes Of Equipment

FOUNDERS

Castings To 12 Tons Ea.
Gray Iron—All Grades
Semi-Stl. Castings
Hi-Ni (Same Analysis As Ni-Hard With Impact Strength Added)
Moly-Iron For Gears

MACHINISTS

Machining On Large Or Small Scale.
Speed With Accuracy
Steel Fabricating
Stock Steel

Toronto Foundry & Machine Co.

ENGINEERS ★ FOUNDERS ★ MACHINISTS

TORONTO, OHIO

Circle Service No. 70

THERE are two big reasons why the trade-mark "Timken" guarantees top bearing value. 1.) It assures you of uniform high quality and performance. From the steel right through to final inspection, Timken® bearings are made to the industry's most exacting specifications. 2.) You're assured of the finest bearing service available.

"Timken" is the registered trade-mark that identifies tapered roller bearings, fine alloy steels and removable rock bits made by The Timken Roller Bearing Company. For your guarantee of value, specify "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

BETTER-NESS rolls on

TIMKEN®

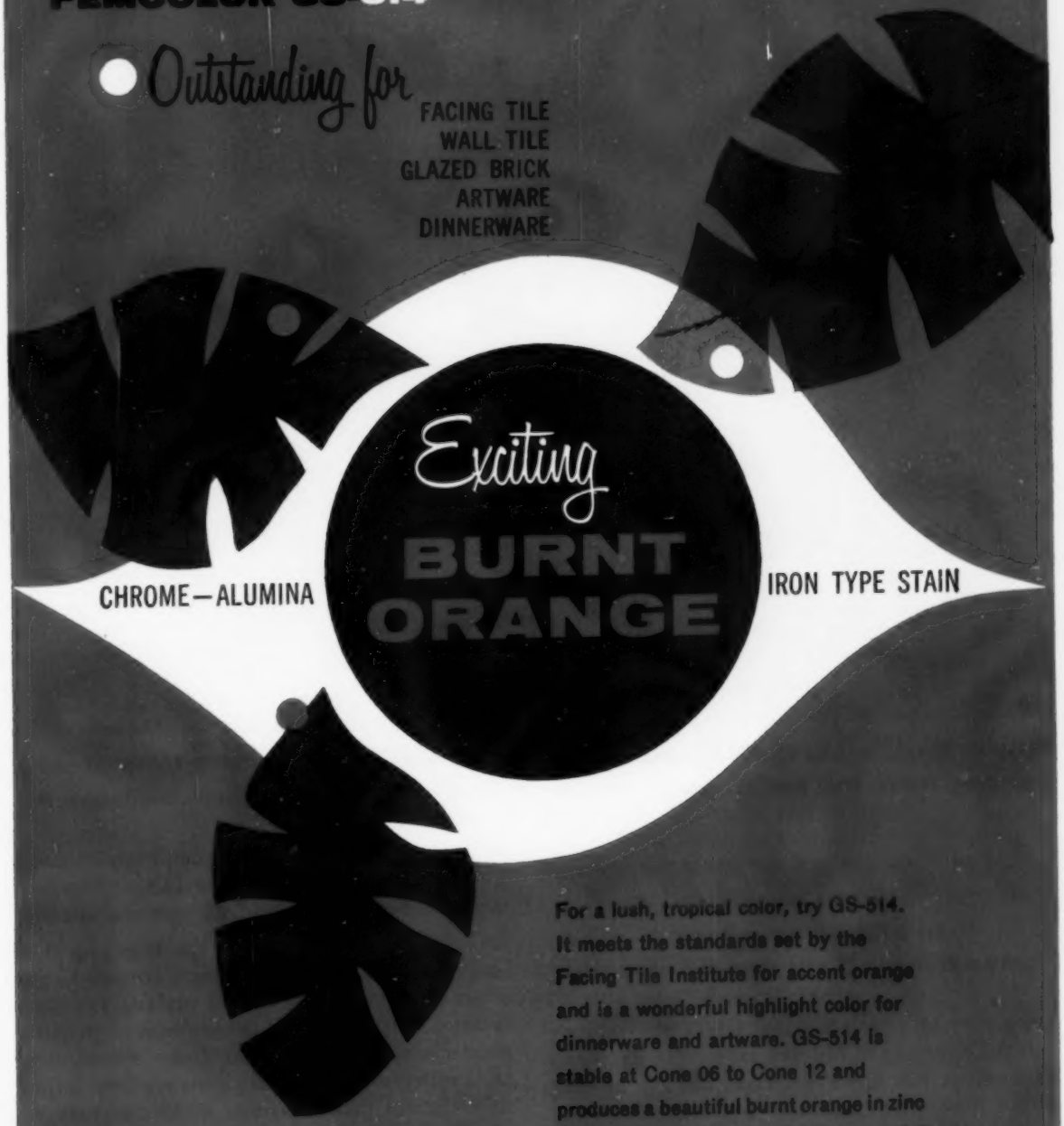
tapered roller bearings

Circle Service No. 71

PEMCOLOR GS-514

Outstanding for

FACING TILE
WALL TILE
GLAZED BRICK
ARTWARE
DINNERWARE



Exciting

BURNT ORANGE

CHROME—ALUMINA IRON TYPE STAIN

For a lush, tropical color, try GS-514. It meets the standards set by the Facing Tile Institute for accent orange and is a wonderful highlight color for dinnerware and artware. GS-514 is stable at Cone 06 to Cone 12 and produces a beautiful burnt orange in zinc base glazes. Why not send for a sample?

50 YEARS OF RESEARCH AND A FLAME

PEMCO

BALTIMORE 24, MARYLAND

CERAMIC FRITS, INORGANIC PIGMENTS, VITRIFIABLE GLASS COLORS

Circle Service No. 72

"Any one of our *UNIT* ¾-yd. shovels very easily loads 600 tons of clay per day from the solid", says Ralph Veon, President, RALPH A. VEON, Inc., Darlington, Pa.

7 UNITS

in eleven years for Pennsylvania Stripping Contractor

Since 1949 Mr. Veon has used UNIT shovels for contract stripping of fire clay. He now owns seven of them — five ¾-yd. machines, like the Model 1020A shown here, and two ½-yd rigs. "We find these machines very maneuverable and easy to operate," he reports. "Our cost of maintenance has been satisfactory for the past eleven years."

UNITS are easy on the pocketbook because they combine power with design simplicity. With UNIT direct in-line drive from engine to main machinery, you get ample power for heaping loads on every pass. There's no separate right angle gear reducer . . . no wasted horsepower. UNIT one-piece cast main machinery gear case design, with all gears, shafts, and bearings completely enclosed and operating in an oil bath, provides positive protection against wear . . . assures longer machine life.

All operating clutches are disc type. Engaging pressure is uniformly distributed for maximum length of service from each friction surface. Involute splined shafts are used throughout to provide greater strength and less wear. Gears, worms, turntable rollers and many other parts are drop forged to withstand greater stresses under toughest job conditions.

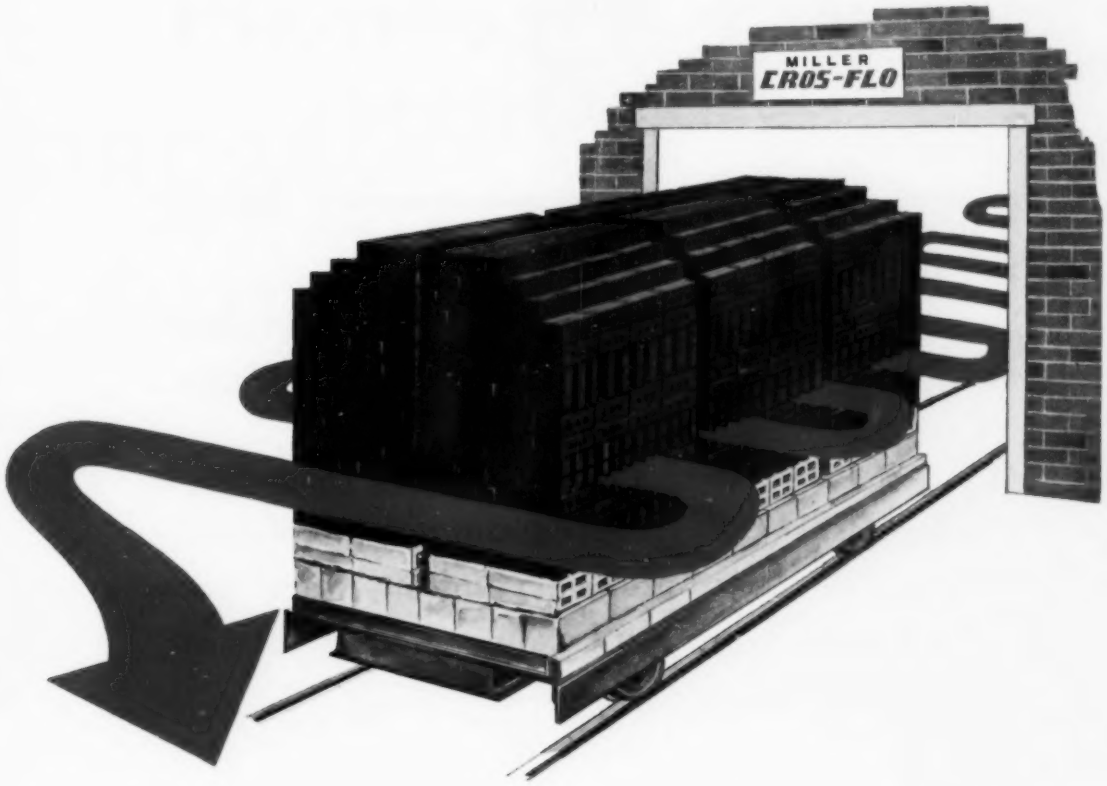
UNIT shovels and draglines are available in ½-, ⅝-, and ¾-yd. sizes. See your UNIT dealer soon to get complete information on the size you need.

UNIT

UNIT CRANE & SHOVEL CORP.

4449 W. Burnham Street
Milwaukee 19, Wisconsin

Circle Service No. 73



Uniform First Quality Ware Day After Day With . . . Miller Cros-Flo Tunnel Kiln

You get nearly 100% salable ware with uniform color and quality with Miller Cros-Flo Tunnel Kiln . . . controllable scientific cooling . . . Cros-Flo fans force heat and gases evenly through stacked ware.

Miller Cros-Flo Tunnel Kilns make use of all usable heat in drying, firing, cooling . . . unbelievably low fuel cost per thousand brick.

Miller engineers design and erect Cros-Flo Tunnel Kilns after a scientific analysis of your material and operational demands . . . Write today for information . . . no obligation.

Look To Miller For The Finest

- **Kiln Cars**
- **Conveyor Equipment**
- **Hammermill Crushers**
- **Engineering Services**

Miller Equipment Company

P. O. Box 1566 • Phone ME 3-2541 • Salisbury, N. C.

Pacific Agent:
WALTER C. STOLL & SONS
5028 Alhambra Avenue
Los Angeles 32, California

Circle Service No. 74

"PYRAX" PYROPHYLLITE

FOR REFRACTORIES

Three special grades of "PYRAX" pyrophyllite have been developed for use in refractories.

Refractory grades of "PYRAX" pyrophyllite can be used to good advantage in refractory brick, refractory cements, unfired refractories, backwalls, radiants, tile setters, saggers, and other special refractories.

"PYRAX" pyrophyllite has a P.C.E. of cone 26 to 27 and where mixed with small amounts of kyanite its P.C.E. can be increased to cone 28 or 29.

"PYRAX" pyrophyllite refractories when properly compounded have a high strength, will not spall or fail due to temperature gradient.

R. T. VANDERBILT CO., INC.
230 Park Avenue, New York 17, N.Y.

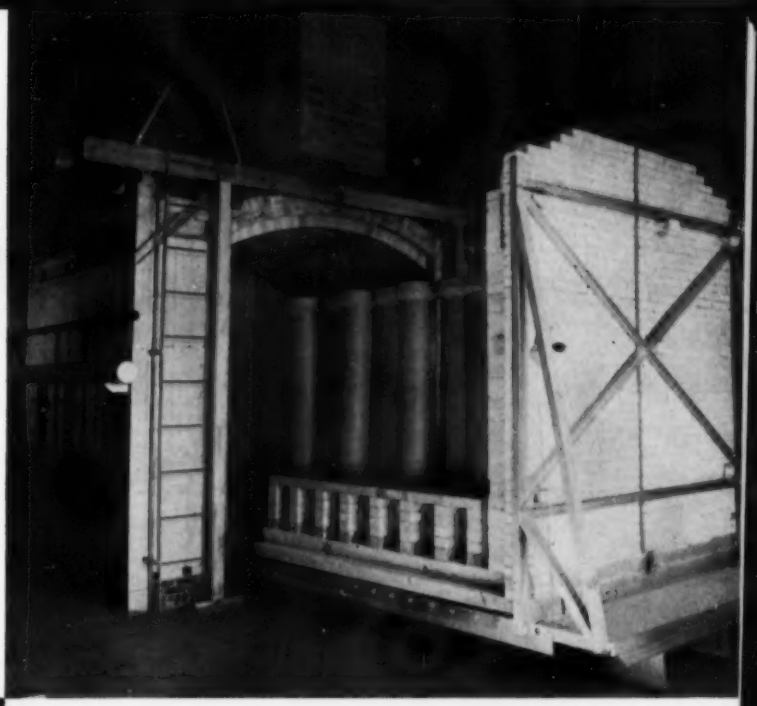
Circle Service No. 75

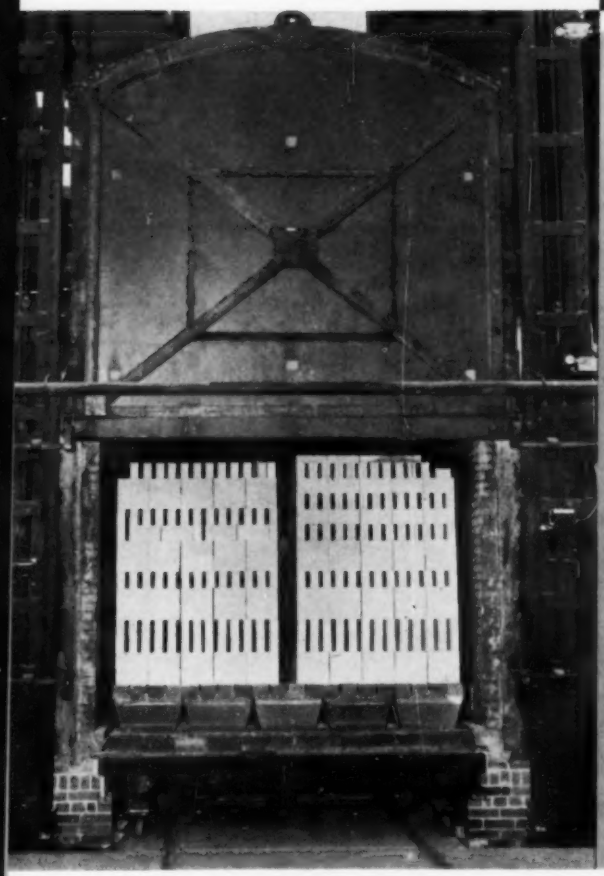
DRESSLER

CAR BOTTOM

SHUTTLE KILNS

Single and Double Door





FOR REFRACTORIES, STRUCTURAL CLAY PRODUCTS, SEWER PIPE AND DRAIN TILE

Dressler Shuttle Kilns feature extreme versatility at the command of the operator. Combining the flexibility of the intermittent kiln with the ease of loading and unloading of the tunnel kiln, these Shuttle Kilns permit great ease of setting, and are available in a wide variety of sizes, enabling complete flexibility for any desired cycle of heating and cooling. They are available also with high speed, high temperature recirculation, speeding equalization of temperature and acceleration of oxidation. ● Let us have your product requirements, and make the proper recommendations for a profitable Dressler Shuttle Kiln installation. Write, without obligation.

ENGINEERING SERVICE

Swindell-Dressler Corporation provides a complete engineering service for the ceramic industry in the design and construction of new plants, and modernization of existing facilities. Consultations arranged gladly on request.

SWINDELL-DRESSLER CORPORATION

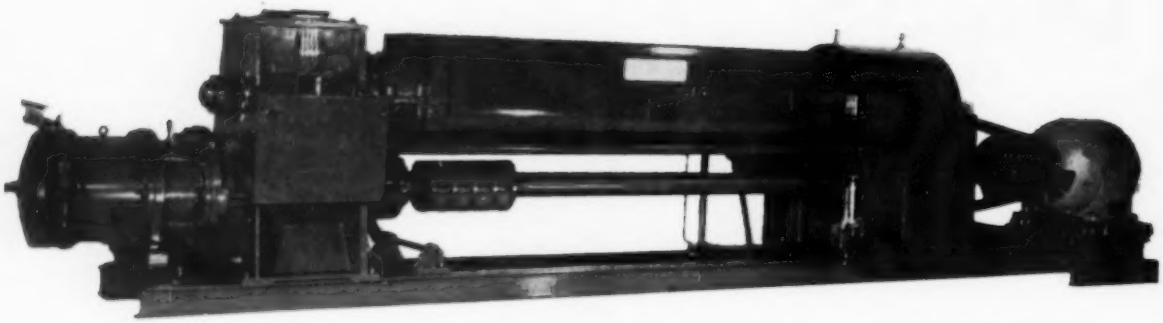
Engineers and Manufacturers

PITTSBURGH 30, PA.

The SWINDELL-DRESSLER CORPORATION of Canada, Ltd., Ottawa, Canada

Circle Service No. 76

THE HIGHEST OF QUALITY

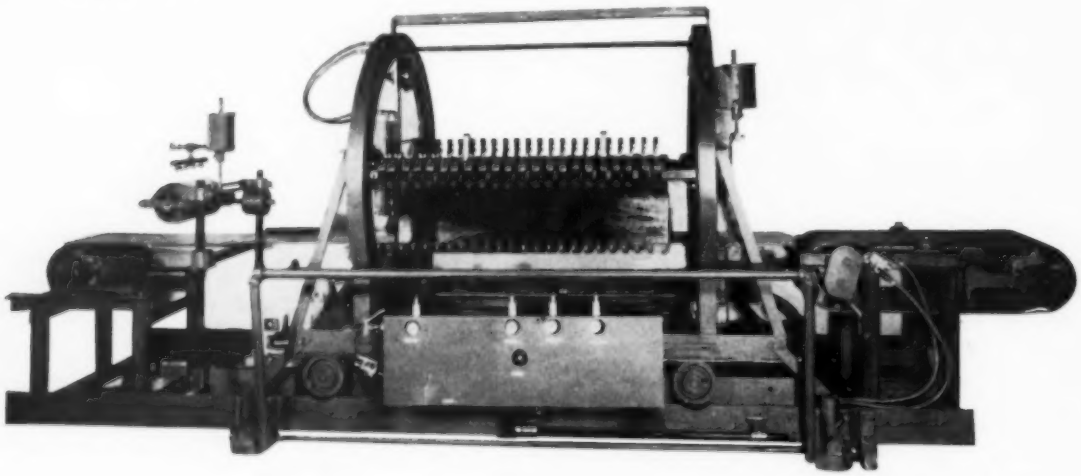


No. 12-AC BRICK MACHINE

Hi-Power model, up to 300 HP, combines all-steel construction and generous use of alloy materials to match today's brick and hollow tile standards with safety factors provided for tomorrow's more exacting extrusion problems. 18¾" auger, fed by 21" augers in vacuum case; 12' pug mill tub.

No. 30 Series CUTTER

Five models of the #30 series, each available in length up to 5 12-in. cuts, are becoming nationally recognized as providing either maximum accuracy or high-speed bar cutting beyond the range of other machines. Quick-change platen assemblies and conveyor tailored to your exact requirements.



IN BRICK MACHINES & CUTTERS

Inquire today about the machines for your production.

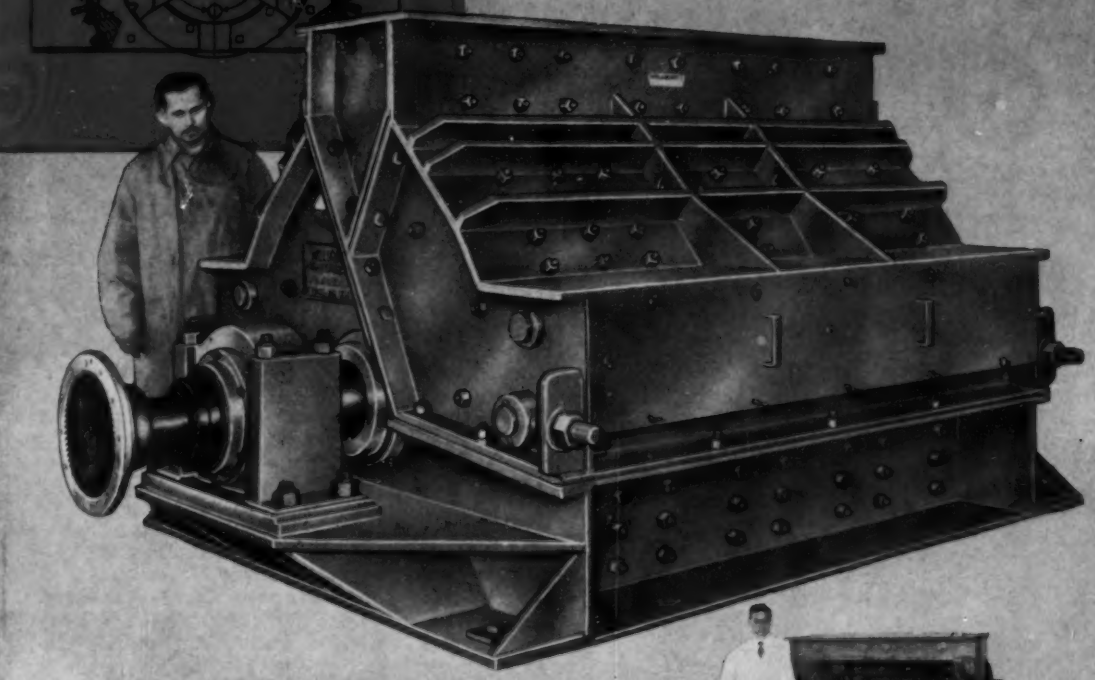
SERVING YOUR INDUSTRY FOR OVER 100 YEARS

CHAMBERS BROTHERS CO. 1857 1960

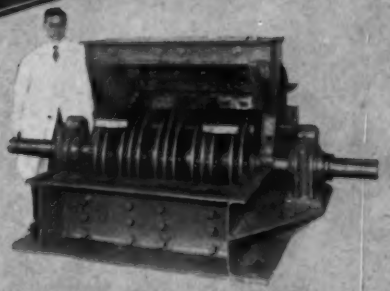
52nd & Media Streets · PHILADELPHIA 31, PA.

Circle Service No. 77

WILLIAMS REVERSIBLE IMPACTOR



- 100% Impact Reduction
- No Friction Or Abrasion
- Unobstructed Discharge
- Less Upkeep Expense

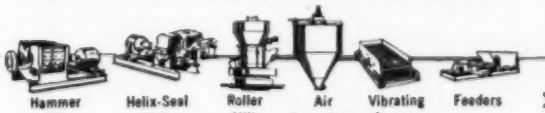


Internal view showing manganese steel impact blocks, hammers and liners. Rugged, heavy steel plate construction. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.

Lower Cost Crushing And Grinding

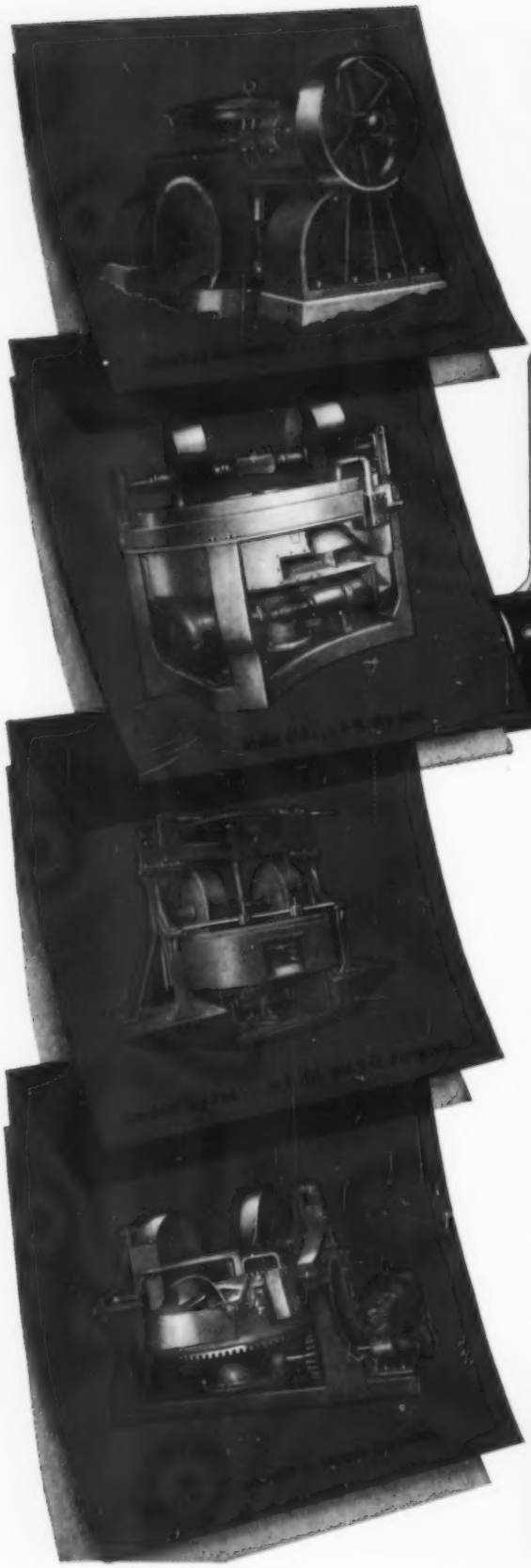
Will reduce clay and shale direct from the bank to 8, 10 mesh, or finer, for burned ware. Reduces its own screen tailings. 100% impact action permits reduction of abrasive materials with lower upkeep expense. Material falls *between* the hammers which throw it against the impact blocks, setting up a repeated ricochet action and the reduction is entirely by impact with no wearing, abrasive, grinding action thereby lessening wear on parts. Hammers can be rotated in either direction, rotated to the right today, to the left tomorrow thereby giving double hammer life. Impact blocks adjustable for wear and fineness of product. Finished material is discharged freely which further lessens upkeep expense. A size for every job. Describe your work and let us tell you about one for your use.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
2709 North Broadway St. Louis 6, Mo.

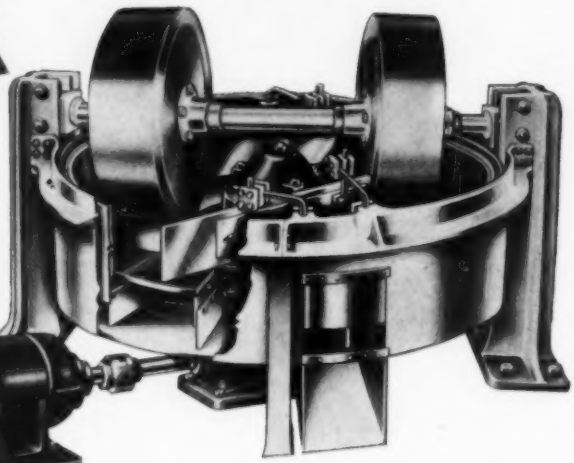


WILLIAMS
CRUSHERS GRINDERS SHREDDERS
Oldest and Largest Manufacturers of Hammer Mills in the World

Circle Service No. 78



You get more tons for less money with CLEARFIELD muller type grinders



Model 900 . . . available in 8½ or 9-ft. diameters.

Whatever your grinding requirements there is a precision-built Clearfield machine to fill your needs exactly . . . to give you years of efficient, economical service.

All Clearfield grinders utilize a revolving pan with screen plates in the bottom, and large heavy mullers spaced far apart to obtain the greatest possible crushing effect. This design principle has proved to be the most efficient, most economical method of grinding . . . and permits the best control of fineness of the grind. And because Clearfield grinders are made of rugged, durable materials you get long, low-maintenance service . . . reduced production costs.

Here's why Clearfield Grinders serve you better:

- Heavy, rugged, rigid construction withstands severe service.
- Crushing weight is sufficient to reduce the hardest clays and shales.
- Weight is distributed to give greatest strength and stability, as well as high capacity, without sacrificing smoothness of operation and ease of adjustment.
- Large crushing area per pan revolution gives high output without excessive pan speed . . . machine-wearing vibration is reduced.
- Ample screen plate area assures proper discharge of material as fast as it is ground.
- Multiple, interchangeable screen plates permit close control of product fineness.
- Parts subject to wear are simple in design, easy to replace.
- Ample size shafts and bearings take heavy loads in stride . . . eliminate down-time.
- Simple, effective method of lubricating all bearings is quick, time saving.

For complete details and sizes, send for our free technical bulletins.

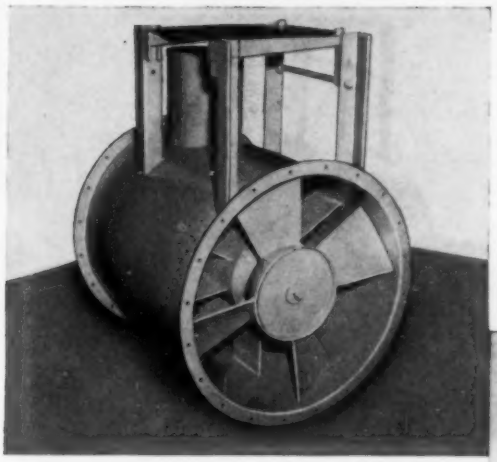
CLEARFIELD
MACHINE COMPANY

CLEARFIELD,
PENNSYLVANIA, U.S.A.

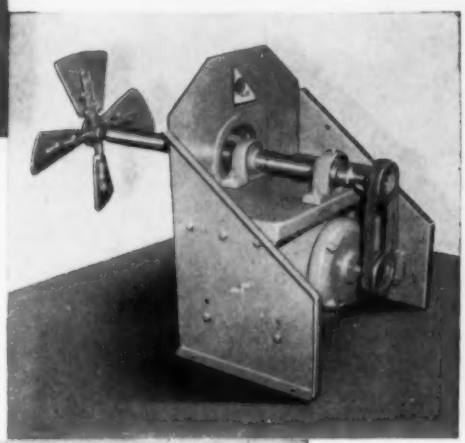
Pacific Coast Representative:
Fernholtz Machinery Company, 8468 Melrose Place, Los Angeles 46, Calif.

Circle Service No. 79

SEVERE KILN RE-CIRCULATION CONDITIONS CALL FOR SPECIAL "BUFFALO" FANS

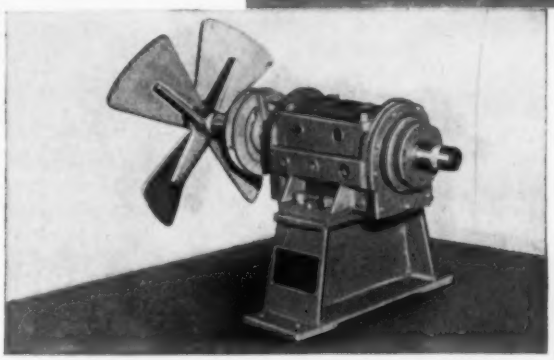


Large Brick Company utilizes these special "Buffalo" Type "B" Tube-Propeller Fans to provide 15,000 cfm at 360° F. Driven by V-belt through fairings, units are installed between inner and outer walls of kiln. Motor is located outside of kiln, away from heat.



Used by Leading Manufacturers of Tunnel Kilns, these "Buffalo" Type "NV" units are built into many of the package kilns in widespread use. Drive mounts against outside wall; shaft extends into kiln. Wheel is correctly shrouded to circulate hot air within kiln.

Throughout the Refractory Field, many of these special stainless steel "Buffalo" Type "NV" fans are used to handle air up to 1600° F. Shaft heat is reduced by heat slinger on shaft just behind the "NV" wheel. Oil leakage and fire hazards are eliminated by rigid, water-cooled bearings with special labyrinth seals. This construction was specially-designed by "Buffalo" engineers to fulfill the specific requirements.



Your "Buffalo" engineering representative will be glad to assist in planning the fans required for your jobs. Call him today, or write for Bulletin FM-2345.

Air circulation in severe kiln applications demands fans that can stand up to punishing day-after-day service without breakdown. Specially designed "Buffalo" Fans like those on this page are providing this kind of dependable service in installations all over the country. These special designs are based on "Buffalo" Type "NV" Heavy-Duty Propeller Fan Wheels. The blades are correctly shaped for optimum air moving at slow speeds. Die-stamped from heavy steel plate, these blades are firmly welded to sturdy, durable spiders.

Also handling hot air in a wide variety of kiln applications are specially-designed "Buffalo" Centrifugal Fans. "Buffalo" Exhausters with "M" wheels are supplying induced draft for lime kilns in many installations. All these special-purpose "Buffalo" Fans are engineered and built to provide maximum efficiency with a minimum of maintenance.

"Buffalo"

BUFFALO FORGE COMPANY

Buffalo, N. Y.

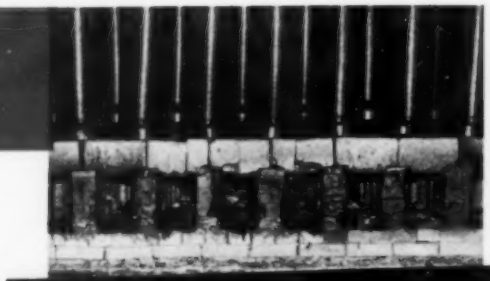
Buffalo Pumps Division, Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

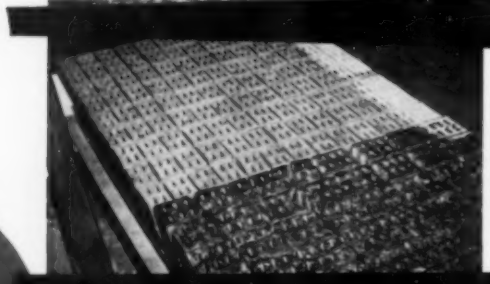
VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING • FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

Circle Service No. 80

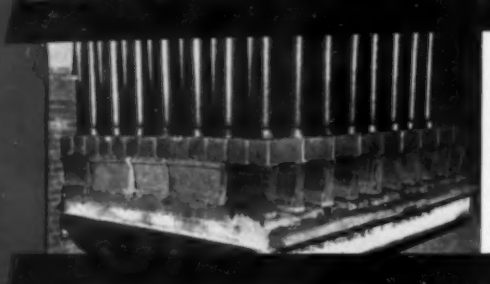
5 times the service life from Remmey SKC car blocks



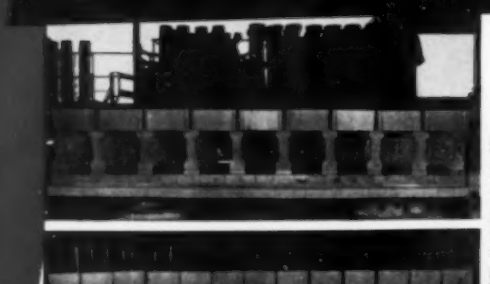
Cartop design used by Pomona Terra Cotta prior to adopting the design of SKC girders and SKC cartop blocks recommended by Remmey. This design provided an average of 3 to 4 months service.



A car of old type cartop blocks (foreground) and a car of SKC cartop blocks (background) after both had been through the kiln a similar number of times.



Many types of refractory girders were tried on the ends nearest the burner but the additional cost was not justified and Pomona has now standardized on SKC girders.



A new car at Pomona Terra Cotta showing their standardized design using SKC girders and SKC cartop blocks. A good solid design that gives as much as 5 times the service formerly obtained.

Pomona Terra Cotta Co., Gulf, North Carolina reports that prior to their usage of SKC Car Blocks, the maximum service they had ever obtained was 4 months. Failure was due to very bad cracking resulting in car wrecks, shut downs and damaged sewer tile. SKC Car Blocks average 18 months service—as much as 5 times the life of competitive clay blocks.

Cut your production costs... Write or call

RICHARD C. REMMEY SON CO.
400 Hedley Street, Philadelphia, Pa.

MANUFACTURERS OF SPECIALIZED REFRACTORIES...

A Subsidiary of A. P. Green Fire Brick Company

REMMEY

Circle Service No. 81

19-yd Scraper effectively self-loads

One Michigan supplies all clay and shale for Webster Brick Co. plant

By putting one Michigan Model 210 Tractor Scraper on their job, officials of Webster Brick Company's Roanoke, Virginia operation, found the savings they were after.

The hills surrounding their plant constitute the mine area. Because loading stations are scattered in 12 different locations throughout these hills, it was formerly considered necessary to use two 9 yd self-propelled scrapers. But now, the Michigan *with 19 yd heaped capacity*, and up to 31.4 mph haul speeds, does the complete job *alone*.

Substantial savings

The need for a second scraper, and the subsequent maintenance and repairs, has been eliminated. Also, a 20% saving in fuel has been realized.

The Michigan runs between the plant and the 12 loading points on haul cycles of ¼ to ¾ of a mile in length. The loaded scraper travels these haul roads in 4th gear at average speeds of 25 mph under normal conditions.

Self-loads shale, frozen clay

In any one pass the Michigan makes, it is likely to encounter seams of shale in varying degrees of hardness. With this in mind, the scraper blade is set to take a one-inch cut over a 300 to 350 ft long strip. The 262 hp engine *driving through a torque converter and power-shift transmission* enables the operator to continue digging through the shale without stopping the machine. The efficient all-Clark power train also helps speed the occasional self-loading which must be done on-the-level and uphill . . . it also helps maintain loading efficiency in winter when material often is frozen solid.

Loads average 15 to 17 cubic yards each

Working like this on a part-time schedule, the Model 210 is loading out 120,000 tons of clay and shale per year. Individual loads, in the predominantly alluvial and plastic clay material, average 15 to 17 cu yds, according to Plant Supt R. M. Bethune.

Michigan Tractor Shovel works inside plant

The Model 210 Scraper dumps material into a hopper which feeds the roll disintegrator. A Model 75A, 1¼ yd Michigan Tractor *Shovel* (left) charges the hammermill, as required, taking the mixed material from a covered stockpile. The Webster plant currently is producing 47 different types of brick and has a kiln capacity of 120,000 bricks per day.

Regardless of *your* production, perhaps Michigans can make *your* job more efficient too. Call us for an early demonstration date. We'll be glad to show you any of the three sizes of Michigan Tractor Scrapers—Model 110 (10½ yd), Model 210 (19 yd), Model 310 (29 yd) . . . or any of the nine Michigan Tractor Shovels (16 cu ft to 6 cu yds).

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT

2455 Pipestone Road
Benton Harbor 15, Michigan

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

Circle Service No. 82

MATERIAL EQUIPMENT SERVICE

For You

A quick look at many advertisements in capsule form.

If you desire any more information on these products simply use the easy circle service card in this issue.

The Tote System cuts material handling costs, improves quality control, and has more economical methods of bulk handling. There is substantially reduced labor requirements for handling and an elimination of recurring unit container costs. Tote System, Inc.

Circle Service No. 62

The reds, yellows and blue used in coloring the bricks for the bright facades of buildings were manufactured by Drakenfeld. Sand colors, engobe stains, glaze stains, colored specks, and prepared glazes are available in a wide variety of colors. Drakenfeld & Co., Inc.

Circle Service No. 63

Seventy years of built-in integrity of performance that assures less down time and reduces maintenance expense . . . that adds up to lowest cost per ton of finished product is the claim of the Bonnot Co.

Circle Service No. 64

A new and improved structural material lead glazed, claybonded, light aggregate (vermiculite) offers many advantages. Its high strength is one major asset. It provides a new structural clay product for both interior and exterior use with integral color styling and a smooth, self-cleaning surface. Lead Industries Association.

Circle Service No. 65

A complete line of Zirconium Opacifiers is offered by Tam, div. of National Lead Co. Boasts uniformity from lot to lot, thus producing consistent results.

Circle Service No. 66

Exact proportioning colors customers desire helps sell bricks. The need for exact proportioning of materials explains why so many of these electric vibrating feeders are employed in so many industries. Waytrols by Jeffery are automatically weighing and delivering exact quantities for mixes going into every kind of product.

Circle Service No. 83

Superlite unloaders have proven fast-effortless-economical in operating efficiency. Save time and labor, reduce your truck fleet, lowest initial cost, speedy deliveries and low breakage. Builders Equipment Co.

Circle Service No. 84

Wide known experience in techniques, processes and quality control for glaze, engobe, body stain, and other brick coatings with the use of inorganic colors which hold their uniformity, light and heat stability. Ferro Corporation.

Circle Service No. 85

Pressers effectively employed for tarbonded dolmite . . . just as they have been employed in the development and eventual production of almost every new type of compacted refractory product in the past 50 years, Chisholm, Boyd and White.

Circle Service No. 86

Monolithic lining costs less and is free of joints which cause linings to bulge and eventually collapse. Linings of Plibrico plastic rerfactory materials and castables install quickly. They conform easily to all contours and save the need for special costly shapes. Plibrico Co.

Circle Service No. 87

Hydraulic Ram Extruder designed for plastic refractories is 75-ton horizontal with self-contained hydraulic system with automatic controls for continuous or manual operation. Chambers Brothers Co.

Circle Service No. 88

Stripping overburden, loading from the pit, unloading boxcars, stockpiling, feeding hoppers, mullers and batchers and etc. are some of the ways other modern clay, brick, ceamic and glass producers are taking advantage of adaptable, flexible and efficient Payloader tractor-shovels. The Frank G. Hough Co.

Circle Service No. 89

An answer to more profitable production is to use a Cross-Flo Tunnel kiln. These tunnel kilns use controlled scientific cooling for high production. Miller Equipment Company.

Circle Service No. 90

Fuel costs reduced up to 23% in kilns lined with B&W insulating Firebrick. Fuel costs are reduced in circular and rectangular kilns and cycle time were shortened in both types of kilns. The Babcock & Wilcox Co.

Circle Service No. 91

Countersunk belt fasteners by Crescent Belt Fastener Co. help to solve excessive abrasive conditions. Thus conveyor belting subjected to heavy abrasive work can now be readily joined for maximum service.

Circle Service No. 92

Pearne And Lacy die-lockers are self contained units specially designed for high speed locking and un-locking. Available for either hydraulic or air operation. Easily replaced with die changes.

Circle Service No. 93

Pipe dies of Coors Ceramics reportedly outlast metal dies 10-1. Coors Porcelain Co. is experienced in production of ceramic die and bell liners for sewer pipe machines or ceramic parts for other extrusion equipment.

Circle Service No. 94

For low shrinkage in the manufacture of your ceramic products AZO ZZZ-88 is available. This zinc oxide is already calcined at high temperature in a carefully controlled atmosphere. Large particle sizes, low bulk (75 pounds per cu ft.) Has thin glaze consistency. American Zinc Sales Company.

Circle Service No. 95

American-made colors of precision—underglaze and overglaze colors—glaze stains—body and engobe stains—A product of Mason Color And Chemical Works, Inc.

Circle Service No. 96

Stoody Co. Borod holds augur edges longer. Is said to triple augur life, reduce downtime, ease extruder starts and cut power requirements.

Circle Service No. 97

Taper-lock steel conveyor pulleys offer maximum strength with minimum weight, unmatched holding power on the shaft and new mounting simplicity. By the Dodge Co.

Circle Service No. 98

Car-top spanner tile by Harbison-Walker Refractories Co. developed for the special requirements of the under-fired car top construction. The fact that it renders dependable service in kilns used for firing face and common brick and sewer pipe at temperatures up to 2200°F. is attributable to certain enhanced physical properties.

Circle Service No. 99

Dragon semi-silica brick resists thermal stresses because of exceptionally high refractoriness and the ability to retain original size. Spalling loss is minimum. Dragon semi-silica assures longer life without vitrification or shrinkage even at high temperature limits. Denver Fire Clay Co.

Circle Service No. 100

Manufacturers of air handling equipment for the ceramic industry Robinson Ventilating Co. offers custom engineers fans, blowers and exhausters to meet the specific requirements of your tunnel kiln, periodic kiln or product dryer.

Circle Service No. 101

Swindell-Dressler maintains an extensive program of research and development for the improved production of ceramic products. Work is being conducted currently on the fast firing of heavy clay products, lightweight clay units, and low-cost clay calcining.

Circle Service No. 102

Bickerstaff, Inc., fork trucks eliminated pallets and strapping. Increased kiln turnover. Reduces loading and unloading time.

Circle Service No. 103

Supply first quality calcined bauxite to major manufacturers of high alumina firebrick and super refractories. Organization is Aluminum Limited.

Circle Service No. 104

Engineering, designing and building is offered by the Foundry & Machine Co., Inc. Gray Iron castings, car moving systems, hydraulic equipment, etc. are offered.

Circle Service No. 105

Kiln car called S-D Floater by Sanford-Day were developed and proved in scores of kilns for trouble-free high temperature performance. Many sizes and styles are available.

Circle Service No. 106

If you are considering the expansion of your present production facilities you may ask Harrop Ceramic Service Co.

Circle Service No. 107

Reduce wear on augurs, dies, liners—lubricate with Additive A Clay conditioned by Kimberley Clark Corp. Adds up to 50% to the life of knives, augurs, dies and liners with effective body lubrication.

Circle Service No. 108

Complete detailing portfolio for industrial roofing, siding and insulated sandwich wall now available from Kaiser Aluminum. In one master file complete in four folios is offered dozens of typical details.

Circle Service No. 109

Ohio Tunnel Kilns made by Ohio Kilns for all types of ware and both the largest and smallest type production. Produce uniform burning and even colors with the least possible loss.

Circle Service No. 110

Complete size reduction from start to finished product is offered in a single Williams Hammer Mill available from Williams Patent Crusher & Pulverizer Co.

Circle Service No. 111

Steel strapped brick reportedly saves builder time and money. This is a service of Acme Steel Strapping. An Acme representative has all the information on their services.

Circle Service No. 112

Payloader by The Frank G. Hough Co. is faster—operates easier. Can unload railcars, load trucks and cars, feed mullers, crushers, Charge hoppers, bins, conveyors, build stockpiles.

Circle Service No. 113

A Varco "Rigid Frame" steel building is built to last and to take it. Gives you better building for less money with fast service on every contract.

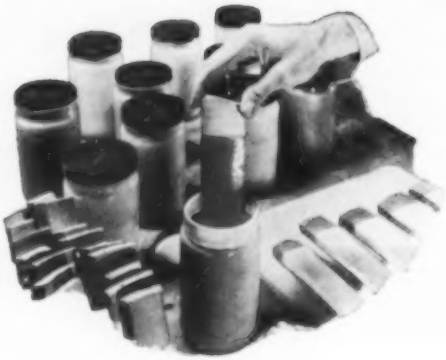
Circle Service No. 114

Complete tunnel kiln instrumentation by the Bristol Co. Is said to be the key to higher quality, more uniform production and greater efficiency.

Circle Service No. 115

FRIT or SALT?

which glaze is best for your products . . . your markets?



THE GLAZING of clay pipe is an old story at Ferro—*salt* glazing since the early thirties; *frit* glazing since the very beginning of the process in 1943-44. In fact, 90% of the frit glazing done to date in this field has been with Ferro Frits especially developed or adapted for such applications.

Frit glazing does offer advantages—particularly so since Ferro has helped its customers greatly reduce the cost of the process. But many factors should be weighed by any producer considering making a change to frit. These include his clay bodies, his facilities, his products and his markets.

To help manufacturers evaluate the new process, Ferro offers a complete technical service. Ferro technicians will find the best frit glaze for your clay bodies, develop the desired uniform color, work out the lowest cost slip formulations, tell you what you need to adapt your present equipment for such glazing, give you a good line on relative costs. With this information you can work out the rest of the equation and *know* that your decision, whatever it is, is based on the most authentic data available.

Why guess when you can have the facts? Contact your Ferro Representative — or write, wire or phone us *here at headquarters!*

FERRO

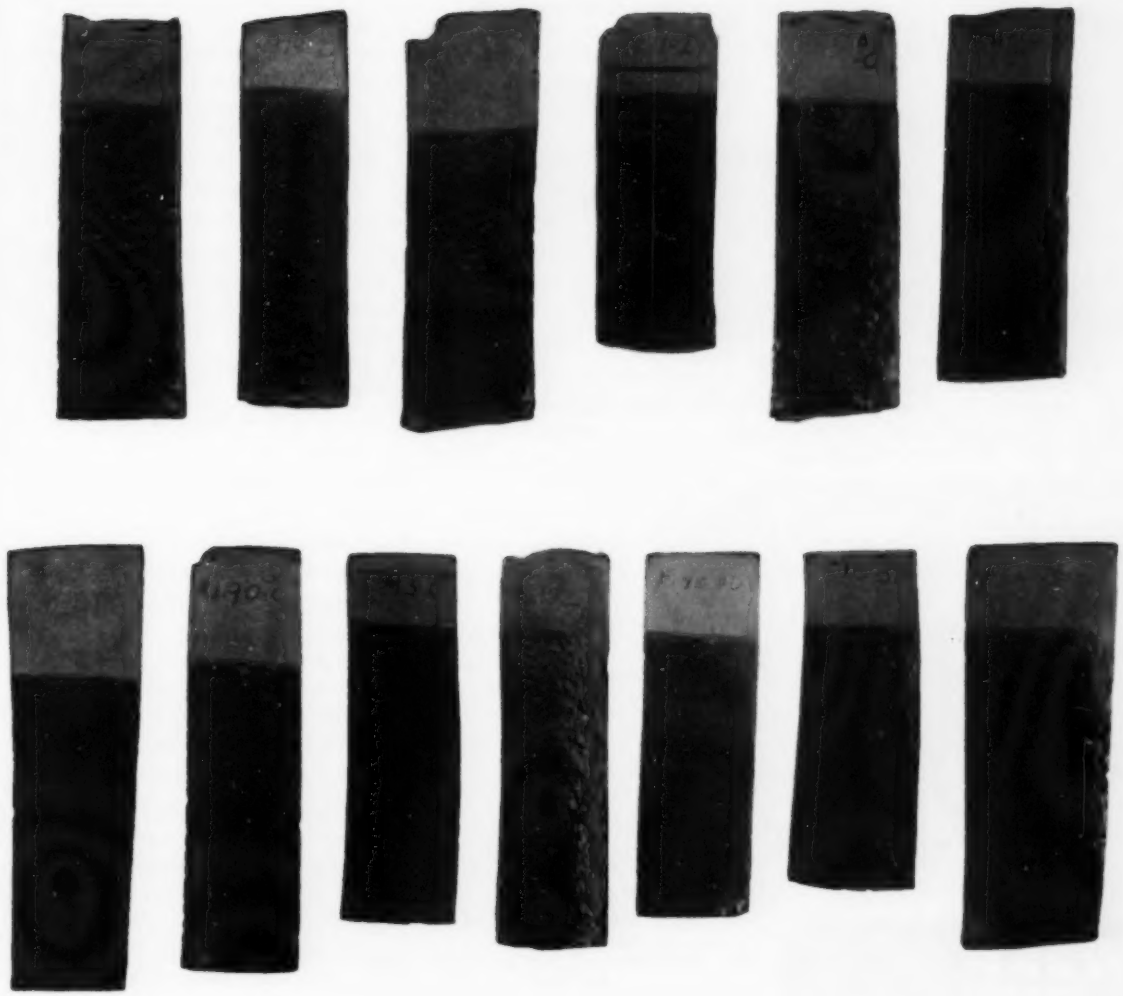
FERRO CORPORATION

4150 EAST 56TH STREET · CLEVELAND 5, OHIO

NASHVILLE 11, TENN. · LOS ANGELES 22, CALIF.

OAKVILLE, ONTARIO (CANADA)

Come to headquarters for your answers on glazing sewer pipe!



Samples shown are from some of the 33 companies working with frit glazes with Ferro's technical help and process guidance.

Circle Service No. 123

ORIGINAL

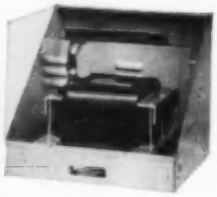
instrumentation for most

precise temperature control

NOW UNIVERSAL:

controls the most unstable temperature systems

Gardsman by WEST | **Model JSB Stepless Controllers**



For any operation requiring precise control of any temperature, through electric heaters, money can't buy a finer instrument. *Infinitely* modulates heater power. No on-off pulses; prolongs heater-life and saves power. Now provided with exclusive manual switch and adjustable maximum and minimum input control. *Tubeless.* Compact. Requires least maintenance and operating attention.

The most compact programming system available includes Model JSBG (left) for any operation involving a time-temperature cycle. Its simply cut cams integrate and control time with temperature.

Check the features that permit longer runs, assure uniform top quality, cut operating costs. Ask your West representative or write direct for Bulletin JSB and JG.

See us at the ISA Instrument-Automation Conference & Exhibit San Francisco, California Brooks Hall May 10-12, 1960 Booth 419-421

the trend is to WEST

WEST Instrument CORPORATION
SALES OFFICES IN PRINCIPAL CITIES

4353-D W. MONTROSE, CHICAGO 41, ILL.

British Subsidiary:
WEST INSTRUMENT LTD.,
52 Regent St., Brighton 1, Sussex
Represented in Canada by Davis Automatic Controls, Ltd

Circle Service No. 124

New Literature

Better Engine Protection with LE Engine Oils is the title of a booklet which describes the advantages resulting from the use of the slower, more expensive, so-called conventional method of refining.

Lubrication Engineers, Inc.

Circle Service No. 53

Causes and cures of efflorescence and early chalking on painted masonry surfaces is described in a 48-page publication.

Gerould Allyn, c/o Rohm & Haas Co.

Circle Service No. 54

The 8692 Single range and the 8693 double-range portable potentiometers and their advantages for making accurate temperature or millivolt measurements in industrial plants and research laboratories is described in a two-page data sheet.

Leeds & Northup Co.

Circle Service No. 55

A four-page bulletin highlighting the research, engineering, testing and custom drying facilities available to industry for spray drying is available.

Nicholas Engineering & Research Corp.

Circle Service No. 56

Linear Flow transmitters are described in four-page product specification P22-1.

Bailey Meter Co.

Circle Service No. 57

The 2-½ yard model L85A power shovel is detailed in a 24-page catalog. Booklet covers details of machine's construction and pictures of machine at work.

The Thew Shovel Co.

Circle Service No. 58

Track pin press which quickly removes and installs track pins and bushings on small crawler-type tractors is described and illustrated in bulletin TP-9.

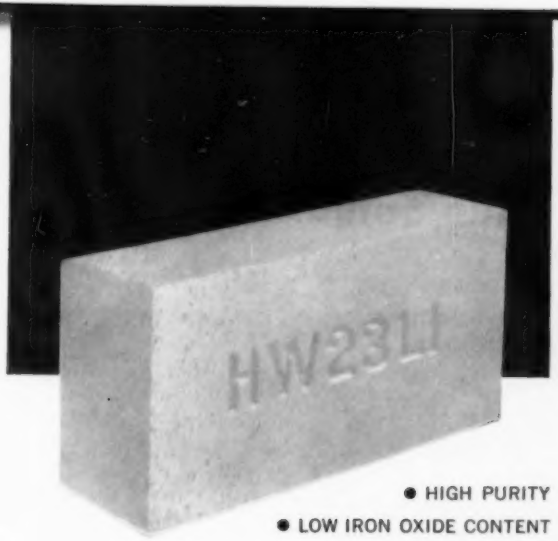
Owatonna Tool Co.

Circle Service No. 59

Released is an apparatus review featuring high size vacuum pumps with gas ballast device that prevents vapor condensation.

Arthur S. LaPine & Co.

Circle Service No. 60



- HIGH PURITY
- LOW IRON OXIDE CONTENT

HARBISON-WALKER
HW23LI

insulating fire brick particularly suited for controlled atmosphere furnaces

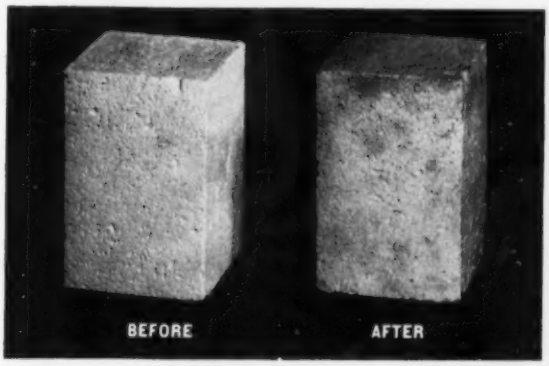
Harbison-Walker H-W 23 LI insulating fire brick produced primarily for controlled atmosphere furnace requirements contains in total not over 2% of accessory oxides, including iron oxide, which are subject to the influence of the usual furnace gas atmospheres. This enhanced property of resistance to the detrimental action of gases is accomplished without any sacrifice of other desirable physical characteristics.

Very low bulk density (27 to 30 pcf), augmented by minute pore size, accounts for its high insulating value. Exceedingly fine texture contributes to desirable glazing and to its good resistance to penetration by volatile fluxes.

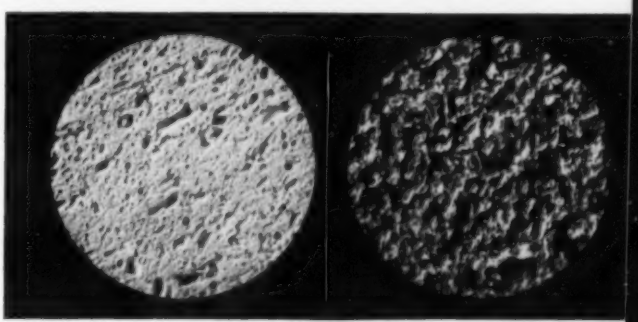
In the prescribed A.S.T.M. 210-46 test for 2300°F. insulating brick, the H-W 23 LI brand, when held at the maximum temperature for 24 hours, shows zero linear change.

The crushing and transverse strengths of H-W 23 LI are adequate for sustaining its weight and the thrust imposed in arches of relatively wide spans, up to its temperature limit.

The optimum combination of physical and chemical properties adapt H-W 23 LI fire brick to a wide variety of uses, in addition to controlled atmosphere furnaces. Write for complete specific information. A sample will illustrate its excellent workmanship.



H-W 23 LI before and after a 500-hour test in an atmosphere of 95% + carbon monoxide (per A.S.T.M.: C288-56), illustrating the high degree of immunity to disintegration by carbon deposition. In this test of long duration at the most critical temperature, H-W 23 LI was unaffected.



Magnification x2, illustrating pore size of H-W 23 LI.

Magnification x2 of another 2300°F insulating fire brick.

Harbison-Walker insulating products also include all conventional classes for service up to 3000°F.

Modern packaging in sturdy cartons assures safe transportation and efficient handling. Packed 25 to a carton.

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
General Offices: Pittsburgh 22, Penna.

World's Most Complete Refractories Service

HW 60-6

Circle Service No. 125

A. C. S. Show Set for Philadelphia, April 24

John R. Townsend to deliver annual Orton Lecture

The 62nd Annual Meeting of The American Ceramic Society, principal scientific association of a $7 billion industry will be held at the Bellvue Stratford and Warwick Hotels in Philadelphia April 24-28.

Members of the Philadelphia and Trenton Sections will serve as hosts to the more than 2,700 persons attending. The presence of more than 40 percent of The Society's membership makes this one of the best attended industry meetings of its kind.

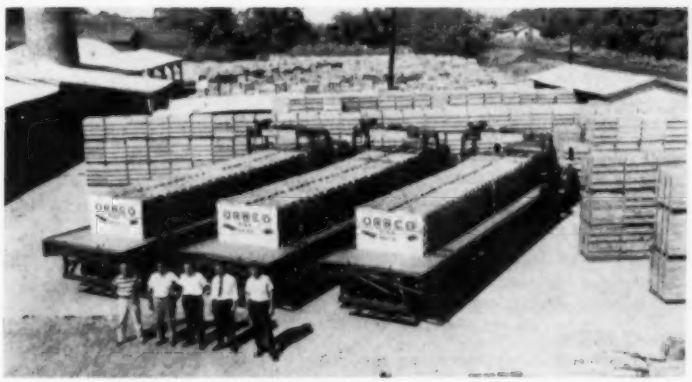
A highlight of the three-day technical program is the annual Edward Orton, Jr. Memorial Lecture to be delivered by John R. Townsend, special assistant, Office of Assistant Secretary of Defense, Research and Engineering. The Orton Lecture honors Edward Orton, Jr. who founded The American Ceramic Society in 1899. Townsend's address is entitled, "Challenge to Ceramics in National Defense."

The Orton Lecture on Monday morning keynotes the three-day technical program, which is preceded on Sunday evening by the annual student speaking contest and official reception. Technical sessions are scheduled Monday afternoon through Wednesday, with Thursday devoted to plant trips in the Philadelphia area.

Join the leaders in efficient Brick Packaging and Handling

with SUPERLITE Unloaders

Robinson Brick & Tile Co., Denver, Colo., have a fleet of nine Superlite Unloaders which handle their very high-grade glazed tile. No clay product is too delicate for the Superlite Unloader.



Owensboro Brick & Tile Co., Owensboro, Ky., must handle several million brick weekly and depend on their fleet of ten Superlite Unloaders to do the job efficiently, quickly and with no loss through handling.

"The Proof is in the trying!"

- *Cut Operating Costs*
- *Reduces Your Truck Fleet*
- *Fast - Effortless - Economical*
- *Speedy Deliveries*

Over 500 Superlite Unloaders are now in use in the heavy clay products industry.

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Blue Book—a Tradition

The Blue Book issue of BRICK & CLAY RECORD is published each year simultaneously with the Annual Meeting of the American Ceramic Society. It is so designated because it carries the advertisements of the Blue Chip suppliers to the heavy clay products industry.

This particular month and this particular meeting provide the time and place for supplier and user to get together for serious discussion as well as some joviality. This is the issue in which the suppliers can tell their product story and be proud to be counted as a blue chip supplier.

The Blue Book issue also serves to enable those who do not attend the convention to see who the Blue Chip suppliers are and what they have to offer and say in the issue.

The cover in addition to spotlighting our blue ribbon-blue book issue, also salutes the impending progress of the brick, lightweight aggregate, refractories and sewer pipe industries, all of which stand on the threshold of one of their most significant decades. This too is a blue ribbon event.

A review of the past ten years shows that the Ceramic Industry while working with the oldest raw materials known to man is not beholden to the old and traditional methods of manufacturing when it comes to mass production. In order to maintain a competitive aspect in the building trade, considering brick and its' myriad of competitive items, the Ceramic Industry has been able to introduce machinery capable of de-airing, pugging and extruding rated U. S. standard brick at the rate of over 20,000 per hour. Another cost reduction has been achieved by the use of a cemented carbide mold box which has increased the die life twelve to twenty times longer than tool steel and reduced the frequency and time involved for die changes while at the same time giving better size control.

The sewer pipe manufacturers have not only increased the quality of their products but also mechanized the production to keep pace with other products which have made serious inroads into their industry. By the use of horizontal extruders for drain tile and sewer pipe they have been able to maintain better size control and lower costs. Quality benefits have been achieved by the introduction of sewer pipe jointing equipment such as slip seals and polyester joints which have resulted in easier installation and longer wear. In production it is now possible to deliver prepared clay direct to a vacuum pugging and extruding machine which delivers the pipe to an automatic off-bearer, automatic finishing machine and automatic pallet loader. All this along with the conversion to straight tunnel kilns and the use of transfer cars capable of handling kiln cars weighing up to 75,000 pounds has automated the heavy clay industry. Should their resultant efforts of the past ten years continue at the same rate there is most assuredly a respected niche for this industry in the future of our capitalistic nation.

Henry A. Sulens
Chairman
M. & E. Division
A. C. S., Inc.

Blue Book Comments

BRICK AND CLAY RECORD contacted a few of the top men in Industry to get their comments on what may lie ahead in the 60's. Here and on the preceding page are printed their exclusive comments.

KENNETH A. BARB
Chairman—Ref. Div. of A.C.S.
Bethlehem Steel Co.

As Chairman of the Refractories Division of the ACS, I have read with a great deal of optimism the speculation concerning the "soaring 60's". Not only from what I've read but perhaps, more important, from what I have personally observed, I cannot help but feel that the nation, and the refractories industry particularly stand on the threshold of the greatest decade in its history.

The last turbulant half century has seen our industry survive three major conflicts, each of which created a battle of steel, aluminum and ceramics. Thus, we in the refractories industry have had to supply refractories for wartime consumption, as well as the domestic boom which also ensued during those years, particularly in the 50's.

Having met and conquered that challenge, we now face the challenge of meeting unprecedented demands for defense and construction in the 60's. The use of ceramics and metals should skyrocket in the 60's. To meet these demands, the refractories industry has been building plant capacities and new research facilities, as well as increasing the standards of quality on the many refractories products. Consumer demands for higher quality products has necessitated the broader use of quality control in all steps of manufacturing.

Our industry is preparing to keep pace with the heavy supply and stringent demands that will be required. To meet the demands, new uses, techniques and packaging methods, highly dependent upon increased automation, will be innovated. New materials, processed with new equipment will mean that labor management and supplier must work together if production is to increase and quality products are to abound.

The Structural Clay Products Industry faces the 60's in better shape than any other decade in its history.

Since World War II this Industry has undergone an amazing transformation from a tranquil activity to a modern technically developed automated branch of our Ceramic Industry even though making use of relatively impure and non-uniform raw materials.

Some credit for this change is due to advances in design of equipment and kilns, but most of the advancements can be credited to those leaders in the field who, with their forward thinking, have set the pace that others must follow.

A look backward at the changes in producing and marketing since pre World War II days should be an inspiration to manufacturers of brick, tile, sewer pipe, flue lining, glazed tile, and quarry tile, to move into the sixties determined to accelerate their technical progress.

Notwithstanding the complacency of some, and the imitation of others, we should salute the programs of research of the Structural Clay Products Institute, The National Clay Pipe Manufacturers, Inc., the Tile Council, National Clay Pipe Research Corporation, Trickling Filter Floor Institute, and the Flue Lining Institute, and the many privately sponsored programs of Structural Clay Products Manufacturers. We should excite them on to expanded programs in the next decade.

This ground work of technical progress opens the way for the Industry to use the great amount of data pubilshed on the basic mineralogical properties of clays. A better understanding of pre-firing or calcining opens up vast possibilities for making new lightweight structural products, or, for more uniform pressing and faster firing of all structural clay products.

Add to these developments the use of chemical additives for controlling extrusion and firing, and add to the basic raw materials the new colors and glazes available to the Industry, and the sixties will see many new structural clay building products.

Automation applies to the construction Industry, as well as manufacturing, so the Structural Clay Industry must make its products easier to install. Complete building panels of brick, or other factory made ready-to-set in place shapes, are demanded —sewer pipe must be installed with factory made mechanical joints by machine for safe leak-proof sewers—products must be delivered to the job in easy to handle packages. Either we recognize the need for these progressive steps, or competitive less enduring non-clay products will move into our age old markets.

The Structural Clay Products Industry needs to move up abreast of our related more advanced ceramic fields, such as glass white ware and electronic ceramics. It needs to tighten specifications. It needs more machine development, better extrusion techniques, and accelerated minutely controlled firing techniques. With these and other possible tools the Structural Clay Products Industry can face the Sixties with confidence.

EUGENE C. CLEMENS
Exec. Vice President
Cannelton Sewer Pipe Co.

Blue Book comments cont. . .

The progress potential in the 60's is of particular importance to the Refractories Industry. New developments will be more varied and have greater impact in the trade than that of any preceeding decade.

In the Heavy Clay phase of the Refractories industry there will be seen an acceleration of the plant rebuilding and automated processing that has been developing. The less efficient, not-so-well controlled operations will be continually improved in that the trade is becoming more highly engineered and more critical. In innumerable cases complete new automated plants will be built to replace those that are not efficiently meeting the ever increasing exacting demands of the new requirements.

The industry has been developing the use of a variety of chemicals to impart special characteristics to Clays. This has produced such desirable results that the consumers will insist upon a continuing research to explore this field of chemical improvements.

Glazing and coloring are becoming a part of certain phases of the industry. At first glance these appear unrelated to Refractories but they are moving in from the Structural part of the Heavy Clay Industry to related Refractory products.

In the field of Special Refractories tremendous strides are anticipated. There will be a greatly increased supply of synthetic Magnesia. This offers endless opportunities through its controllable Chemical properties, its improved refractoriness and its greater resistance to slags and to corrosive atmospheres. This availability will accelerate the present trend to more Basic roofs in open hearth furnaces as well as the fields of Basic refractories in cement kiln linings, glass furnace walls, ports and checkers and as checker brick in open hearth furnaces.

With the advent of special refractories in the field of missiles and nuclearonics, the exactness of dimension of the burned product is important. This trend is rapidly being reflected in the more exacting dimensions required of all refractory products.

Very few of us will believe the honest conservative predictions for the 60's. Truly the magnitude of the progress to be made in the field of Refractories will not be fully realized until it can be viewed in retrospect.

RALPH R. RHODES
Trustee for the Refractories Division.
E. J. Lavino & Co.

It's not too difficult to predict some things that are bound to happen in the 60's.

For one thing, to take care of our ever increasing population it has already been determined that the number of buildings in the United States will have to be doubled during the next 40 years.

This building program is underway and will be greatly accelerated in the 60's. Some of these buildings will use brick, structural clay, terra cotta, and other ceramic products. The amount they use will depend to a large extent on how you as producers keep pace with changing times.

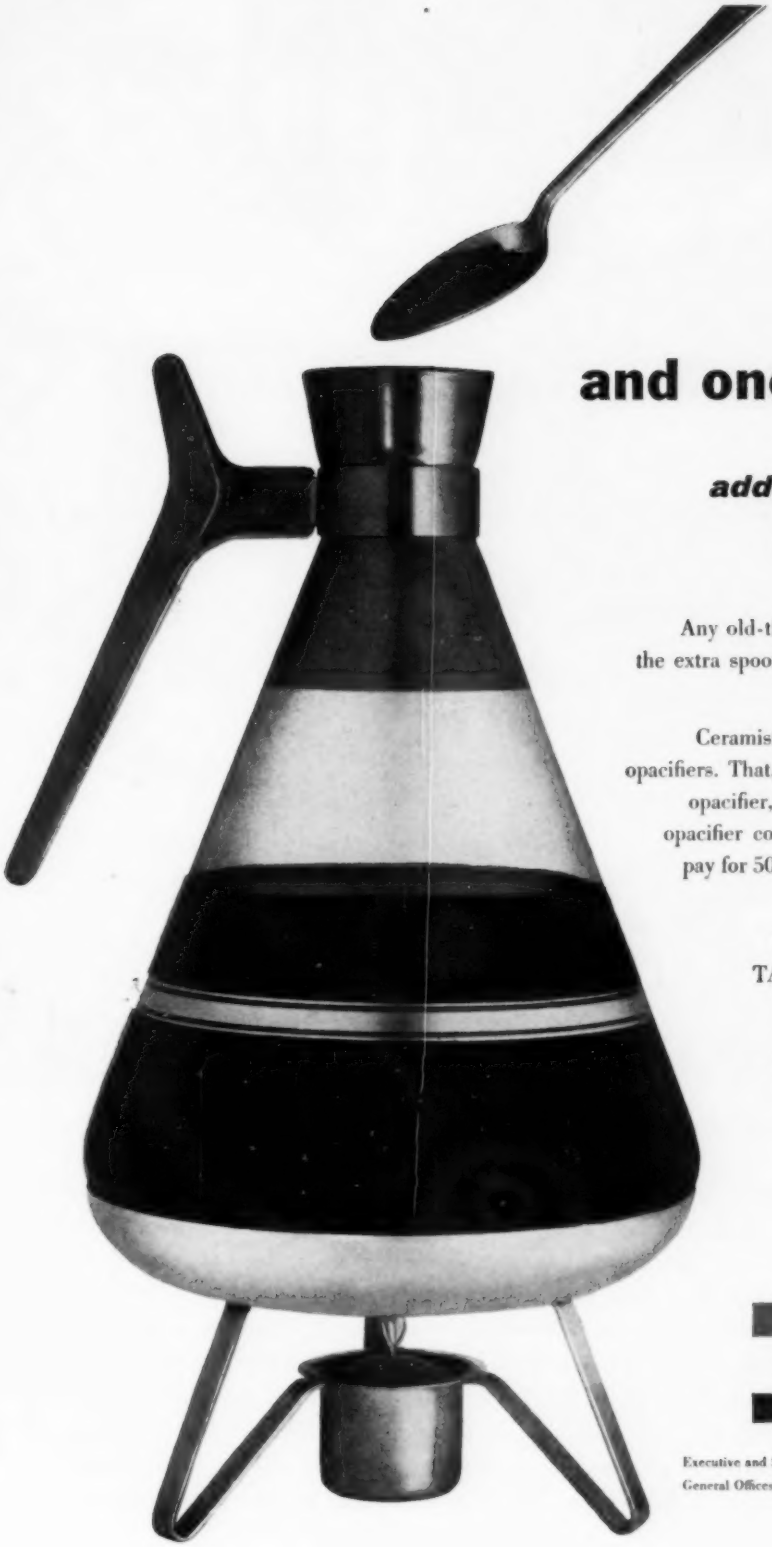
The only thing in the world that is permanent is change. It hardly seems necessary to point out that these changes or new discoveries are being made at an ever increasing rate. Ten years ago we as a nation were spending 2.8 billion dollars per year on research and today we are spending at the rate of 10 billion dollars a year on research—what will the rate be in 1970.

To survive then means new products, new colors, new shapes, new textures, new uses, new techniques in manufacturing, new techniques in installation, and new techniques in selling. It means an ever increasing use of automation in manufacturing, in packaging, in delivering, and in installing.

To accomplish the above will surely require the use of new raw materials and new equipment. The suppliers of materials and equipment have as much at stake in this program as do the manufacturers of the finished product. It, therefore, means the close cooperation between supplier and manufacturer on a program of research and development, both individually and collectively.

Of one thing we can be sure, a bigger market will be there and it will go to the people who can produce the desired materials.

FRANK JANSMA
B. F. Drakenfeld Co.



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EDITORIAL

Architects Want To Know

The Editors of BUILDING CONSTRUCTION ILLUSTRATED, a companion publication to BRICK & CLAY RECORD, have been conducting a series of meetings with architects and contractors in which building materials were discussed.

It was very interesting to note how eager the architects and contractors are to learn more about building materials.

For instance, in regard to a certain masonry product, they wanted to know its color range, its weight, sizes available and the remainder of the obvious qualities. However, they were more curious about its hidden properties as, for instance, its coefficient of expansion, the sound absorbing capacity, its porosity, ability to resist freezing and thawing, its performance life span, etc.

All of these properties have been measured in clay products but in many cases have not been talked about enough.

It is indeed fortunate for clay products that this curiosity exists. It is understandable among the younger men and newcomers who probably hear some of these details for the first time but the curiosity exists also among the old-timers.

Clay products promoters, advertisers and engineers have told the story many times and should tell it many times more.

What a wonderful convincing story can be told about heat capacity of clay products, their indestructability, the new lightweights, the larger sizes, the new colors and the new methods of building which step up rates and cut costs!

It's really this kind of information that the architects want: That type of information which gives them the ability to design with confidence.

As was pointed out earlier, the clay products industry does well in disseminating information about brick and tile, but is it enough? Why should the editors of BCI find such keen desire for product data in their meetings with architects and contractors? Is it because industry information is lacking? Or could industry communications leave something to be desired.

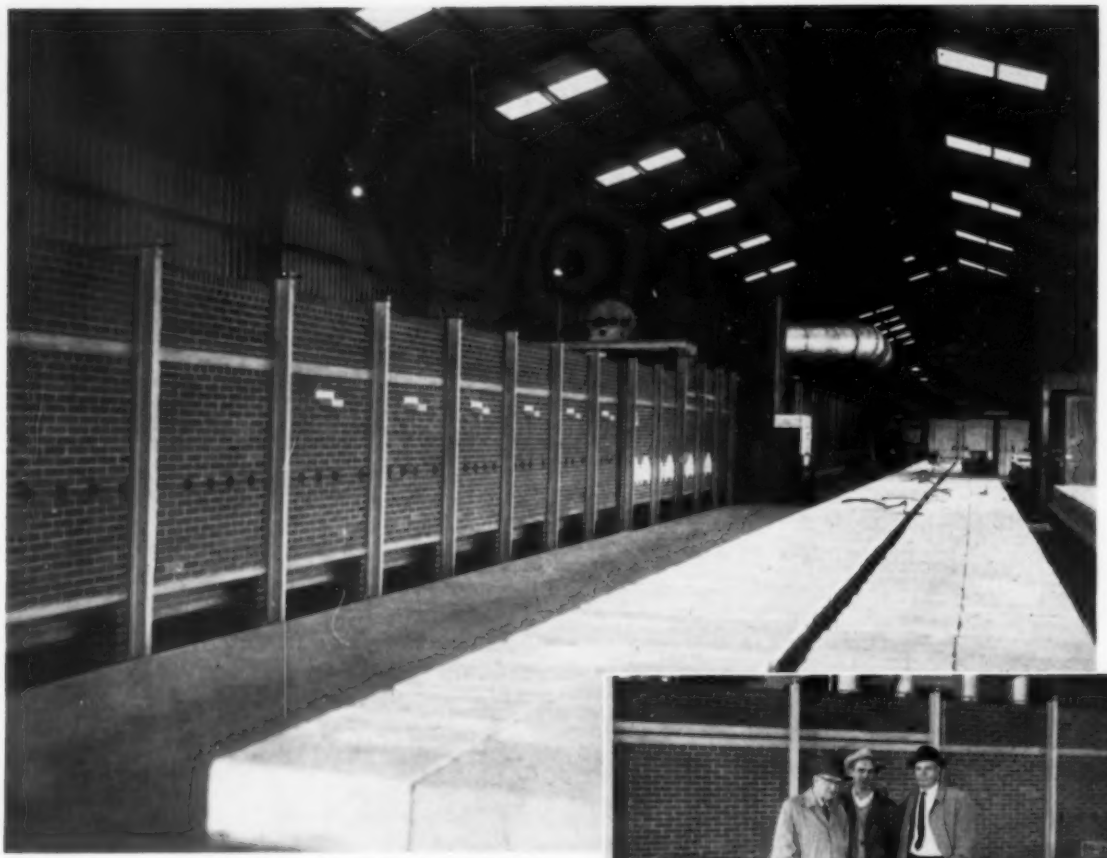
Here is an opening for clay products to get in good sales licks for brick and tile by satisfying the architect and contractor with adequate information. They surely are eager for it.

J. J. Shea

Executive Editor

B&CR Editor on hand as:

Chattahoochee Lights Fifth Tunnel Kiln, Ups Production 30%



146' cooling zone of the Harrop kiln and a line of the 126 kiln cars furnished for the Chattahoochee installation.

Left to right, Harry G. Thornton, Chairman; Bill Anderson, Ceramic Engineer; and English Robinson, President of the Chattahoochie Brick Co.

On the morning of March 16, 1960, Howard Clark and Bob Parr, chief engineer and resident engineer, respectively for Harrop Ceramic Service Co., along with personnel from Chattahoochee (Ga.) Brick Co. lit the fires in their new 8-brick wide tunnel kiln. To bring you the up-to-date report on the 356-ft. kiln, Neal Mohler, Brick & Clay Record's technical editor was present at this important step in the company's expanded operation.

Continuing their modernization and improvement program which started several years ago, the Chattahoochee Brick Co., Atlanta, Ga. recently lit their fifth tunnel kiln. Located in the suburban area of Atlanta, Ga., the company is producing 100,000 brick daily in their four 4-brick wide tunnel kilns. The new eight-brick wide kiln with an expected production capacity of about 70,000 brick per day will enable the company to increase its overall capacity by 30% and keep up with the evergrowing industrial and residential building boom in the Southeast.

H. English Robinson, President, decided on the 8-brick wide kiln for several reasons: higher production per capital required, increased efficiency of operation, and greater flexibility for the smaller kilns when the large kiln is in operation. The new Harrop kiln is expected to supply the number of brick which three of the smaller kilns are now producing, hence re-

leasing production of the small kilns for a variety of special products.

Part of Chattahoochee's improvement has been centered on preparing the mill room to handle the increased production that would be required for the new kiln. Transfer tracks were extended and a third rail was installed on four of the hacking tracks, so that the larger cars could be handled on one of the mill room's two machine lines. Today it is possible in the mill room to hack either three large cars simultaneously, or four small cars simultaneously, or, two large and two small cars at the same time plus the four small cars on the mill room's original machine line which will be used exclusively for the four-brick wide cars.

Plans are being made for the installation of an entirely new mill room when the situation demands that a second large tunnel kiln be built. Space has been provided in the layout of the new plant for such an installation.

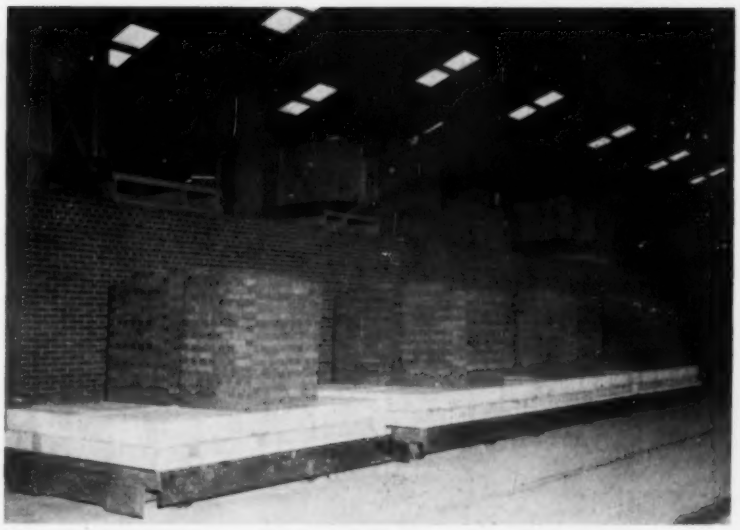
The new dryer and kiln, along with green storage area, is housed in an L-shaped rigid-frame clear-span structural steel building, 400 feet long. The green storage area and dryer are located in the foot of the "L" which is 100 feet wide and 180 feet long. The kiln proper is partially built into this area and extended into the main leg of the "L" which is 50 feet wide and 220 feet long. The buildings were erected by Dixie Steel Company, a subsidiary of Atlantic Steel Corp. in Atlanta.

Five tracks are provided in the green storage area for overnight and weekend storage of the cars after they are hacked. Movement of the cars is by powered transfer cars equipped with winches. The present green storage area will serve as the hacking area when the new machine line is installed and hydraulic pushers will be provided for moving the cars at that time.

Twin Tunnel Dryer

As the need dictates, the cars of green brick are transferred into the double-track dryer which is 136 feet long, holding 14 cars on each track. The dryer is equipped with three recirculating zones plus the waste heat zone and exhaust zone. Robinson Ventilating Co. centrifugal-type fans provide circuation of the

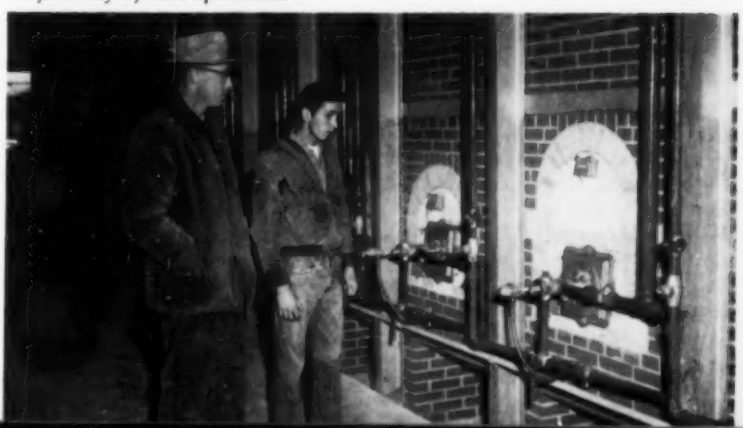
Continued on page 95



Baffle cars prepared to go into the kiln for the drying-out procedure and startup operation of the kiln.

Charging End of Harrop Double Tunnel Dryer is equipped with hydraulic pushing units by Engineering Associates, Inc.

John Winn, left, plant superintendent checks with fireman on first day of kiln operation.



View of jaw crusher, hopper, control room, and beginning of conveyor belt.

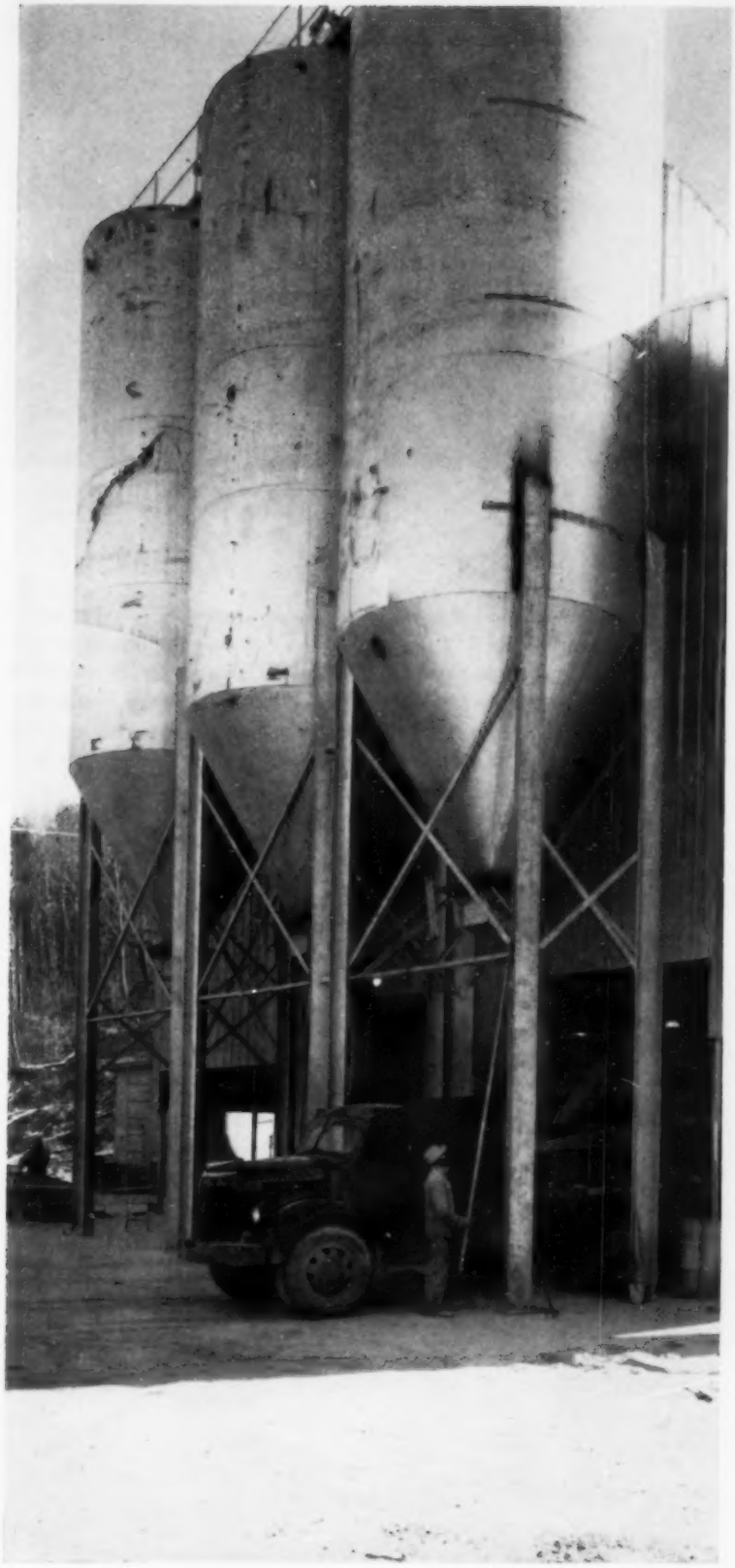
Hillsboro, N. C. Site of New Mineral Grinding Plant For Pyrophyllite Company

By E. H. Jeffries, Jr.
from data by
Mason K. Banks and Dan E. Stephens

Quality in the refractories industry depends almost entirely upon control of quality in the raw material. Without this control, laboratory, production, and inspection control can do nothing to change the basic fact that the raw material must be inherently a quality material, and must be beneficiated to approach as nearly as possible a pure material.

With this thought in mind and with the idea of improving even more on the already high quality standards achieved in Paco tunnel kiln car tops, North State Pyrophyllite Co., through their minning subsidiary, Piedmont Minerals Corp., recently put into operation a new grinding plant at Hillsboro, N. C.

Selection of the site was influenced primarily by the large ore body lo-



cated at this mine. The largest individual body owned by the company, it contains resources estimated to last several generations. Complete limits of the body have not been discovered.

Additional benefits to the company besides beneficiation of the ore are utilization of more of the ore, control of both mineral content and grain size, economy of operation, elimination of hauling certain fractions, relief of part of the grinding load from the Greensboro plant, and dust control at both plants.

The mining operation at Hillsboro is essentially a quarrying operation, drilling and blasting in an open pit mine. Rock is loaded into dump trucks by a front end loader and hauled approximately one quarter of a mile down hill to the upper end of the plant. The plant is built on the slope of a hill to provide as much gravity flow as possible.

The flow through plant equipment begins with an apron feeder which discharges into a jaw crusher with a rated capacity of 100 tons per hour. The rock is reduced from quarry size to five-inch maximum in the crusher, and is discharged onto a belt conveyor which is 130 ft. long. Moving at 300 ft per minute, this conveyor discharges into two steel storage silos which are 12 feet in diameter and 36 ft. high. Each silo has a capacity of 175 tons and is the first major control point in the process. Each silo contains a different grade of ore. Control of mineral content is accomplished here with each silo equipped with variable speed feeders for blending of the ores. Further control is planned with future addition of two more silos which will provide a further breakdown of ore types when this becomes necessary.

The vibrating feeders on the silos discharge material at a controlled rate onto another belt conveyor which discharges the material into a chute equipped with a stationary grate or a grizzly. All material of less than two inch size goes through a rotary dryer and all material over two inches to a cone crusher.

Continued on next page

Final product storage and truck loading station.

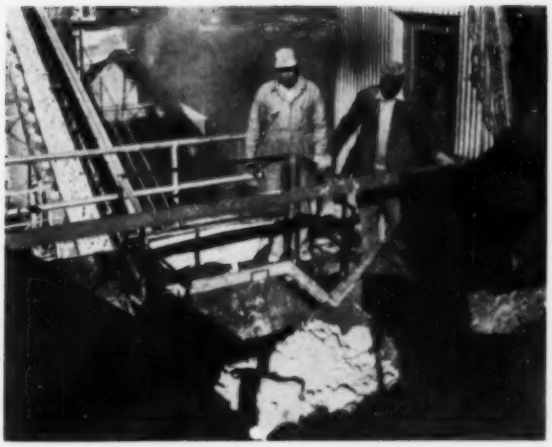
Quarry is located about one mile uphill from plant, so that haul is downhill.

The dryer is direct fired with a 30 gallon per hour oil burner. Temperatures in the dryer are adjustable with the average discharge temperature about 300°F. The dryer itself is four feet in diameter and 24 ft. long.

The oversize material which is fed to the cone crusher is reduced to ½-inch size. With a yield of 40 tons per hour from this machine, the material is blended with the discharge from the dryer. These two materials are placed on a common conveyor where the hot material from the dryer acts as the drying agent for the material from the cone crusher. Conversely, the material from the crusher acts as a cooling agent for the product from

Conveyor to first stage storage tanks.

View of lead in road and lower end of plant.



Hopper above jaw crusher, with control room at right.

the dryer, so that the belt does not become overheated. At this location the ore is now all minus two inches and is basically a dry material. All equipment at this point is now operating well under capacity and is capable of providing the ore as described to all the equipment further on in the system.

From this point the material enters a closed system where it is fed to a 60-ton per hour elevator which carries the material to two sets of screens. A total elevation of 40 ft. is required here, the only place where flow of material is reversed. The closed system is made up of a double-roll crusher and another cone crusher in addition to the elevator and screens. By screening, regrinding and blending in this system, any desired grain size or combination of grain sizes and mineral content can be obtained.

Material is discharged from this system, one product at a time, and is elevated to three silos similar to those in the initial phase of preparation. Only one product at a time is stored in each silo, which are conveniently located so that dump trucks can back under them to receive their load. The haul to the Greensboro plant with a 17½ ton payload is about 40 miles.

Not Hauled

The discarded portion of the ore thus is not hauled and much of the grinding load is taken off the Greensboro plant. The differential grinding allows the beneficial materials, such as Andalusite, to be present in increased percentages and eliminates the detrimental minerals to a point where they are no longer harmful. The fraction containing the beneficial minerals can be blended back to give the exact mix desired, as well as the exact grain size. Variation has been virtually eliminated even from the first days of operation and the improvement is noticeable not only in the laboratory, but even in appearance.

To the user of PACO car tops, this plant, along with other improvements in the mixture, means more uniform size, more uniform body texture, increased strength, and increased resistance to heat shock. Laboratory tests indicate a 100% increase in desirable properties, the most important of which is retention of strength after repeated cycles of heat shock. The lab tests show that after three cycles of our shock test, 80 to 85% of original strength is retained. The length of time that this represents in a production kiln is, of course, hard to determine, but it is estimated to be on the order of one or two years service. Most of the competative car tops tested retained about thirty to a maximum or forty-five percent of original strength when subjected to our tests. The old Paco mix retained from 55 to 70%. The new Paco mix, therefore, shows the best strength retention after shock of all materials that have been developed.

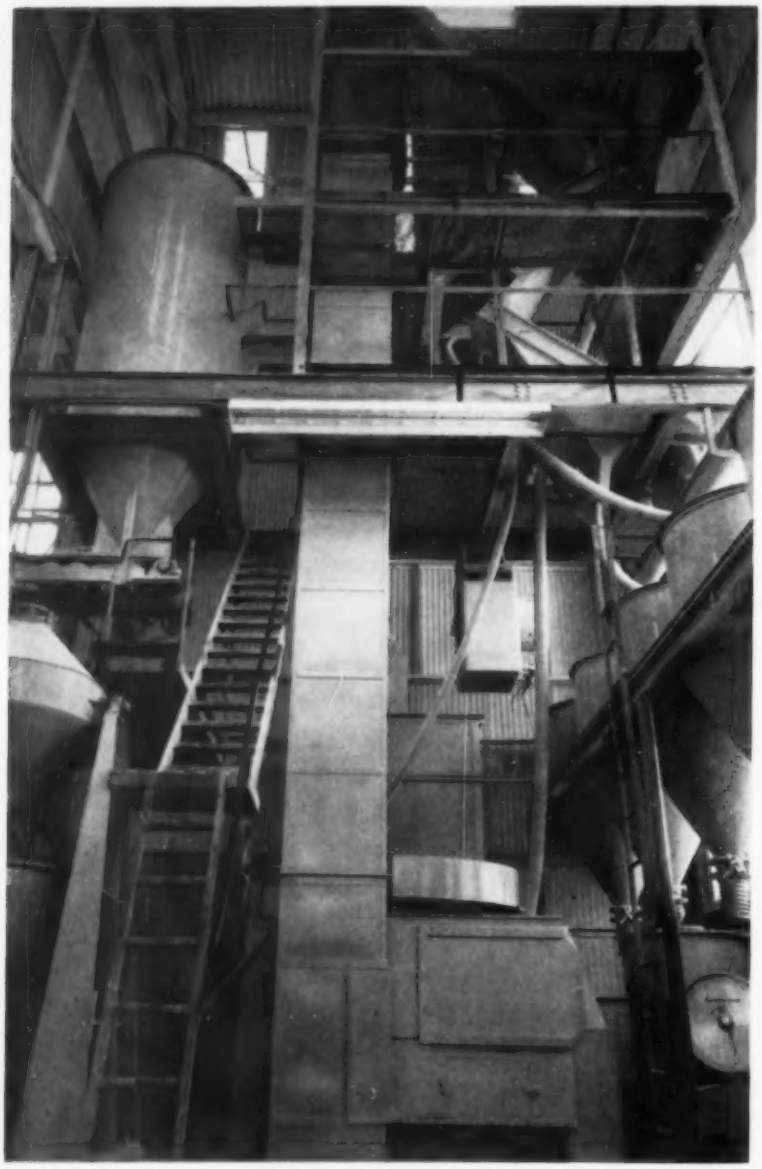
To summarize, the new Hillsboro grinding plant gives to North State Pyrpohyllite Co. beneficiation or ore, control of mineral content, economy of operation, control of grain size, and relief of grinding load at the Greensboro plant. It gives to North State customers assurance of uniformity of size, uniformity of body, added strength, added resistance to heat shock, and greater retention of strength after shock.

Equipment Used at North State Pyrophyllite Co.
Apron Feeder—Cedar Rapids
Jaw Crusher—Cedar Rapids
Cone Crusher—Symons
Oil Burners—Hauck
Screens—Simplicity
Double-Roll Crusher—J. C. Steele
Cone Crusher—Allis-Chalmers

Globe Brick's

Research Center Allows Large Size Runs

Research—one of the key ingredients to success in the 60's—is playing an integral part in the operation of the Globe Brick Co. located at Newell, West Virginia. Always concerned with the three essentials of brickmaking: improved raw materials, better forming and pressing of ware, and improved firing practice, Globe built a research center capable of aiding in all of these phases as well as in many other fields of operation.



View of pilot plant showing dry pan, elevator, screens storage bins and traveling crane with dial. On left is conical blender and view of 10 ton storage bin and feeder under bin.

The building with 2000 square feet of space was designed by S. C. Porter Jr., Plant Engineer. The operation is under the direction of J. A. Roslund, Chief Ceramic Engineer, and a veteran of nine years with Globe. The building, less than a year old, was built at a cost of $100,000. It is divided into two departments, the pilot plant and the research and quality control section. A. E. Covert and Edmund Starr, Ceramic Technicians are assigned to the center.

The pilot plant can duplicate normal production practice. Crushed clay direct from the mine is stored in a bin with a five ton capacity. A Syntron feeder located under the bin feeds directly into a five foot dry pan, made by Toronto Foundry. The ground clay then passes over vibrating screens, so arranged that the screened clay can be separated into various segments and stored separately in conical bins. The three ft. by five ft. screens are made by Star Foundry & Machine Co. and are electrically heated. Under the conical ground clay storage a traveling Fairbanks-Morse scale permits controlled batching of the various ingredients. The weighed material can be dry blended and then stored in a 10 ton storage bin. Facilities for forming the brick consist of a Chisholm, Boyd and White, Model X press and a Dennison hydraulic, C press, 60 ton capacity. A high speed mixer is used to temper the clay and water, prior to pressing.

Building of the research center and pilot plant was prompted by several factors. Globe is one of the major producers of ladle brick. Its product is used 100% by the steel industry which has become increasingly cost conscious and quality conscious in today's competitive market. New processes and more rugged use put increased demands on refractories for uniformity and improvement in essential physical properties. These properties, to mention a few, include bulk density, volume change on reheat, apparent porosity, refractori-

View of Boyd Model X press. Special trials are made on this press. By using a belt, brick from this press can be conveyed directly to tunnel kiln cars for hacking.

Control laboratory showing Beckman P_h meter.

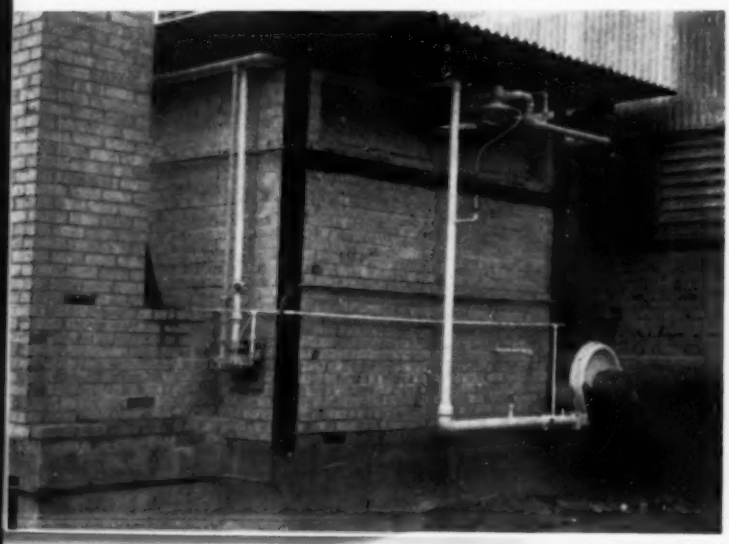
ness, modulus of rupture, and uniform size of the finished product.

These conditions make it necessary for the producer to be continually on the search for ways to improve the present product, both quality-wise and costwise. To do this requires facilities such as those described.

The quality of current production must also be checked periodically. Equipment is available to determine the more important physical properties. This includes a Tyler Rotap and standard screens, Harper Electric Furnace, Denver Fire Clay P.C.E. furnace, Abbe Jaw Crusher, Beckman P_h meter, electric drying oven, modulus of rupture apparatus, and an assortment of scales, pyrometers, a spinner press for forming test bars, and a large eight ft. by five ft. gas fired test kiln. Some properties, such as screen analysis, moisture content, bulk density, apparent porosity and size are checked daily. Other properties are determined at appropriate intervals. Data thus accumulated is condensed into standard reports and the information made available to the production departments.

William F. Porter, Vice-President, Production, conducts bi-weekly meetings with the superintendents, foremen and engineers. Any fluctuation in quality is discussed at these meetings, any proposed change in operation is thrown open for consideration by the group and the men are kept advised concerning company policy.

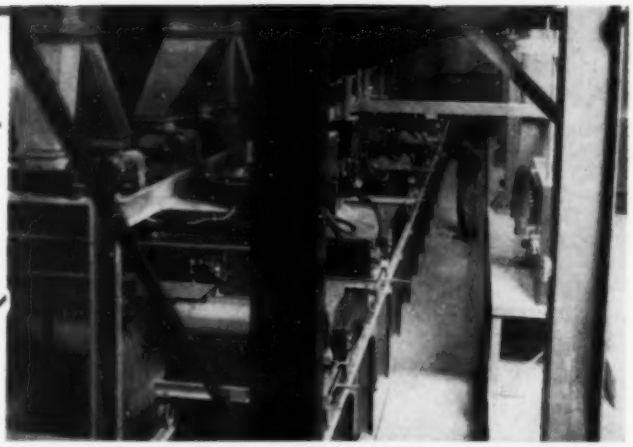
Picture of gas fired test kiln, located adjacent to pilot plant.



Proud of Plant

Globe is justly proud of the pilot plant and research facilities which combine the ability to produce large size trial runs with the close control of laboratory practice. It will be possible to supply customers with trials of special materials in large enough quantities to give reliable service trials in the field. As Winston A. Porter, President of Globe, stated in the January issue of BRICK & CLAY RECORD—"The ladle brick is no longer just a brick, rather it has become a specialized item . . . that will give the consumer longer life at the lowest cost of installation in their ladles."

Use High Quality Equipment To Make A High Quality Product



Automatic Batching Equipment

MOHITE
A High Fired Super Duty Brick

BANNER
A Super Duty Brick

MISSOURI FLINT
A High Heat Duty Brick

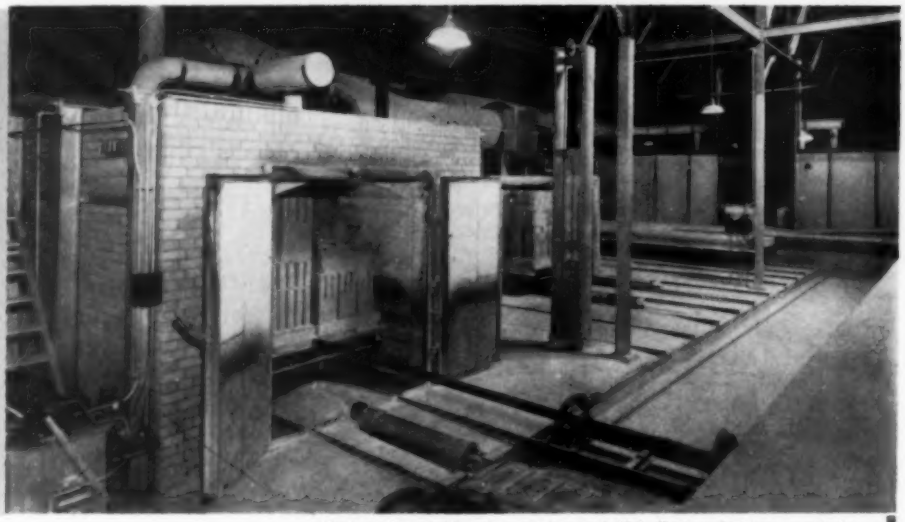
DURALITE
A High Alumina Brick

KASTITE
Hydraulic Setting Castables

BRICKSET
Mortars and Cements

BRICKMIX
Plastic Firebrick

SPECIAL SHAPES
In all qualities



Modern tunnel kilns for regular and high fired refractory products

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WELLSVILLE *Fire Brick* COMPANY

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Circle Service No. 129

Refractories News

Announce New Basic Plant

E. W. Valensi, President of North American Refractories announced recently the construction of a new Basic Brick Plant at Womelsdorf, Pa. Scheduled for completion in late 1960, the new plant will manufacture basic brick and specialties products which are finding increased use in steel and other industries. Engineering plans have also been completed for construction of a manufacturing unit, at a location to be announced later, for the production of tar bonded brick used to line steelmaking oxygen converters. It is anticipated that both these plants will be in operation by the end of the year. The addition of these two new facilities to the seven existing plants of the Company, located in Pennsylvania, Ohio, Kentucky and Missouri, will enable NARCO to supply industry with an increased number of high quality refractories products from strategic plant locations.

ASTM Committee to Study Corrosion

An ASTM Committee on Refractories has begun work on the development of methods for determining alkali corrosion of glass tank refractories, it was reported at the ASTM Committee Week in Chicago, recently. Studies have been initiated on static and dynamic tests applicable to the erosion of glass tank refractories at the "metal" line in glass furnaces.

A method for chemical analysis of silicon carbide brick and a method for determining the resistance of carbon refractories to disintegration from alkalies (a blast furnace problem) will be submitted to the Society for adoption at its Annual Meeting in June. A new classification for chrome, chrome-magnesite, magnesite-chrome, and magnesite brick (excluding electrically fused products) also will be presented.

Work on extending the temperature range of pyrometric cones was announced. Four new PCE cones above cone No. 42 are being calibrated with a maximum temperature of about 2600 C.

Carborundum Co. Wins Safety Award

The Latrobe Plant of the Carborundum Co.'s Refractories Division has won the Pennsylvania Manufacturers' Assn. Casualty Insurance Co. safety award for more than a million man hours without a disabling work accident, the second time in three years the plant has won the award.

Gabor Named H-W Chief Engineer

Charles D. Gabor has been appointed chief engineer of the Harbison-Walker Refractories Co., Pittsburgh, Pa. He became associated with Harbison-Walker in 1941 as a draftsman in the engineering department.

Norton Co. Announces New Appointments

Curtis H. Weissinger has been appointed project engineer in the refractories division at Norton Co., Worcester, Mass. He has worked at Norton Co. for more than 30 years, most recently as supervisor of the technical service development in the refractories division. In his new position, Weissinger will coordinate the work of the refractories division and the plants engineering department.

Frank G. Gustafson has been appointed supervisor of the process engineering department in Plant 7 at Norton. Joining Norton in 1952, Gustafson has worked as a grinding engineer, supervisor of the sales engineering department and as chief sales engineer of the abrasive division.

Denver Fire Clay Co. To Expand

The Denver (Colo.) Fire Clay Co. will spend more than $135,000 in modernization and expansion of its Denver facilities for the production of refractory products, according to Richard Shepard, president.

This year's expansion budget is in addition to the more than $200,000 spent in the last two years. New equipment to be installed will include a 75-ton hydraulic press to be used in the production of special refractory shapes, and new equipment for the clay preparation process.

Harbison-Carborundum Adds Research Positions

C. Burton Clark, formerly Senior Mineralogist with Harbison-Walker Refractories' Research Department, has joined the Harbison-Carborundum Corp., Falconer, N. Y. In this new connection his capacity will be Research Supervisor, Fused-Cast Refractories for Metal Industries. Clark is a graduate of the Univ. of Ill. and also attended the Univ. of Pittsburgh's graduate school. He became associated with H-W in 1937. Discoveries in the field of atmospheric effects on refractories in service and new techniques of spectographic analysis are credited to his research efforts. More recently he has been involved in nuclear studies as Manager of H-W's Nuclear Studies Group.

In another research appointment, William A. Miller has been named Supervisor of Research, Fused Cast Refractories for Glass Plant Service by the Harbison-Carborundum Corp. A graduate of Rutgers Univ., Miller joined the Carborundum Co. in 1948. He participated in starting up the Fused-Cast Refractories plant at Falconer, N. Y. Quality control, product engineering and process engineering are other areas in which he has been involved. A member of the American Ceramic Society, he has authored several papers on production of refractories for the glass industry.

Van Zandt To Speak at TRI Homestead Meeting

The Honorable James E. Van Zandt, member of the House of Representatives from the 20th District, Pennsylvania, will be the guest speaker at the spring meeting of The Refractories Institute at the Homestead, Hot Springs, Va., May 5 and 6. He is scheduled to speak at the membership meeting, Friday morning, May 6. Reservations can be made for the meeting by writing directly to The Homestead with a copy sent to the Institute for their records.

Influence of Silicone Pretreatment and Wetting of Brick on Moisture Penetration of Brick Masonry

by T. Ritchie
Building Materials Section
National Research Council, Ottawa, Canada

High-absorption brick were treated with a water-soluble silicone before they were combined with mortar into brick masonry. The resistance of the masonry to moisture penetration was much improved compared with that in which untreated brick or brick soaked in water had been used. The silicone pretreatment in some cases increased, in others decreased, the strength of bond in direct tension between brick and mortar compared with that obtained from the brick used dry. Outdoor exposure of brickwork samples demonstrated that silicone pretreatment of bricks resulted in cleaner-appearing brick masonry.

Lack of complete contact between brick and mortar is the most important cause of rain penetration of unit masonry according to many studies of the problem reported in the literature (1). Investigations on the problem made in the Division of Building Research of the National Research Council of Canada have also indicated that unbonded areas between brick and mortar are a major weakness in the resistance of brickwork to moisture penetration. Overcoming the problem therefore hinges in large measure on obtaining a complete bonding of mortar to brick. Many factors influence the extent of bond; the suction of the brick is particularly important in this regard. In general, with brick of high suction (exceeding 25 grams per minute per 30 square inches of brick surface, by the standard ASTM test) it is difficult to achieve intimate bond between brick and mortar.

Reducing brick absorption by soaking the brick in water prior to use is frequently recommended, but the practice is not free of criticism as indicated in a Swiss report (2), which states, "In foreign specifications it is often recommended that the bricks be wetted before laying. Wetting, however, has various disadvantages, namely, longer drying times, reduced thermal insulation capacity, tendency towards efflorescence, difficulty of control at the building site." Soaking brick results in an added construction cost and there is a danger in cold weather bricklaying that wetting of brick may promote danger from frost.

A silicone surface-treatment of brick applied before they are used in a wall has been advocated as a means of obtaining efflorescence-free brickwork (3). Such a treatment is known to impart water-repellancy to brick surfaces, therefore high suction brick have their suction reduced as a result of the treatment. It might be expected, therefore, that more complete bonding between mortar and brick would result from the use of silicone-treated brick and that, because of this, greater resistance to moisture penetration and overall durability of the wall would result.

To determine the influence of silicone pretreatment of brick on moisture penetration of brickwork, thirty-two small brick panels were constructed and tested for moisture penetration by a method developed by the Division of Building Research.

Use Small Panel

Briefly, the method is based on the use of a small test panel 5 bricks high, with four horizontal mortar joints. This panel is placed vertically in a frame and clamped to a box in which a water spray and air pressure are developed, as in the large-scale wall leakage apparatus used by the U. S. National Bureau of Standards and others.

Two types of brick and two types of mortars were used. Each of the two types of brick was used in four conditions, (1) dry, (2) soaked in water for 10 minutes, (3) treated with a relatively light concentration of silicone, and (4) treated with a heavier concentration.

Brick

The brick were obtained from the Toronto, Ontario area. One type had been made by the dry-press method and was very high in both suction and in absorption. The other was an extruded brick which was lower than the other type in suction and absorption. Properties of the brick shown in Table I, were determined from test of 20 brick of each type.

The brick for a test panel were not selected to have a particular suction value, but were used as they came from the pile. Those which were to be laid wet, were soaked in water for 10 minutes, then removed and wrapped in plastic sheet until used. The influence of this soaking treatment on the suction of the brick is shown in Table II.

A water-soluble silicone, described by the manufacturer as "sodium salts of a silicone in water solution", was used to treat the brick. The brick were totally immersed in the

TABLE I

Properties of the Bricks

Property	Dry-press Brick		Extruded Brick	
Suction (gm/min/30 sq in.)				
Average	109.6		39.9	
Maximum	131.7		41.9	
Minimum	92.8		36.1	
Saturation Coefficient				
Average	0.88		0.80	
Maximum	0.90		0.82	
Minimum	0.87		0.78	
Absorption (% dry weight)	24-hr. immersion	5-hr. boil	24-hr. immersion	5-hr. boil
Average	21.4	24.2	13.2	16.6
Maximum	22.8	26.0	13.5	16.8
Minimum	19.7	22.8	12.9	16.1

TABLE II

EFFECT OF 10-MINUTE SOAKING IN WATER ON SUCTION

Brick Type	Original Suction (gm/min/30 sq in.)	Suction After Soaking (gm/min/30 sq in.)
Dry-press bricks	100.7	16.8
	106.8	12.2
	111.1	16.5
	115.1	13.3
Extruded bricks	(Range 36 to 42)	9.5
	—	10.3
	—	11.8
	—	12.9
	—	13.9

— not measured

solution for five seconds, and were then allowed to dry in the laboratory air for several days before use. Various concentrations of solution were used to determine the effect on brick suction, shown in Table III. It is seen that the suction of the dry-press brick was greatly reduced at relatively low concentrations of the silicone solution, but the extruded brick, for the same 5-second dipping time, required a considerably stronger concentration to reduce the suction appreciably from the original. In the 5-second dip, the dry-press brick absorbed, on the average, 125 grams of solution, while each extruded brick absorbed only 45 grams of solution.

When the concentration of the silicone solution was 0.4 per cent or greater, the dry-press brick, on drying, were marked by white salts, a condition described in another study (3). To reduce the brick suction to a very low value, however, only half this concentration was needed, and for the solution concentrations used to treat bricks for panel construction, no salt deposits formed on the brick.

In the case of the dry-press brick, silicone solution concentrations of 0.05 per cent and 0.2 per cent (silicone solids as a percentage by weight of water) were used to prepare brick for panel tests. The 0.05 per cent concentration produced brick suction between 51 and 88 grams, as shown in Table III, while the 0.2 per cent concentration produced suction of 1.1 grams or less. For the extruded brick, silicone solution concentrations of 0.15 per cent and 0.25 per cent were used, which produced suctions of 4 to 15 grams for the former concentration and 2 grams or less for the latter.

Mortar

One of the mortars used was composed of masonry cement and sand, in proportions by volume of 1:3. The other mortar contained portland cement, lime and sand, proportioned 1:2:9 by volume. The mortars were mixed in a small mechanical mixer, each batch containing 1/30th cubic foot of sand and other materials proportioned accordingly. A separate batch of mortar was prepared for each joint of the panel. A moderately high flow, usually between 125 and 130 per cent, was used, but variation in flow from batch to batch was noted.

The water retention value of the mortars differed considerably. That of the masonry cement mortar was 64.7 (average of three tests); for the cement and lime mortar the average value was 88.8.

Panel Construction

The panels were constructed, and stored before testing, in a room maintained at 73°F and 50% R.H. In making the panels, a ½-inch bed of mortar was laid on the bottom brick; one minute later the next brick was placed on it and tapped with a 4-lb. hammer falling 1½ inches. On completion, the panel was enclosed in a plastic sheet for 24 hours. After this period, the sheet was removed and the front and back faces of the panel were exposed to room conditions until the test, which was made at the age of 14 days.

Test Results

Simulated rain conditions were produced by a water spray and by air pressure in the small-scale leakage apparatus. An air pressure difference of 2 inches of water was maintained across the panel. Each brick was used in four conditions and with two mortars; each combination was tested in duplicate making a total of thirty-two panels.

A summary of the results of the tests is given in Table IV, which shows for each panel the total amount of water, in ml, that passed through and leaked off the back of the panel in the first hour of test and in the 24 hours of test. In addition, the maximum rate of leakage in ml per minute is shown; as noted in other tests the rate of leakage usually decreased very sharply from a maximum value that was reached shortly after the start of the test. The length of time for dampness to be observed on the back of the panels following the start of the test is also shown in Table IV.

At some time during the 24 hours of test dampness appeared on the backs of all the panels, in many cases in less than one minute after the start of the test, but in one instance there was no dampness for 6 hours after the test started. The amount of moisture which passed through the panels and was collected after dripping from the back varied greatly among the

panels and in one case no leakage water from the panel was collected, while for another panel over 34000 ml. of leakage water was measured. The rates of leakage also varied widely, from very slight for several panels to over 100 ml per minute for that panel with the highest leakage rate.

Duplicate panels in many cases behaved in a similar manner in regard to leakage characteristics, but in others reproductibility of results was poor. Panels of brick lightly treated with silicone were particularly erratic in results, possibly due in part to the wide suction range of bricks lightly treated, as shown in Table III. In the case of duplicates B16 and B17, the first was quite leaky and the second quite resistant to moisture; almost all the leakage for the latter occurred from one opening in a joint.

It is clearly indicated, however, that with the possible exception of the extruded brick used with the 1:2:9 mortar, the silicone pretreatment, which reduced the suction to less than 2 grams, resulted in panels of much greater resistance to moisture penetration than those panels in which the brick had been laid dry or soaked for 10 minutes in water before laying.

For all the combinations of bricks and mortars, it was indicated that soaking the brick for 10 minutes before they were laid produced panels of greater resistance to moisture penetration than those in which the bricks had been laid dry. The silicone pretreatment, by which the brick suction was not reduced to a very low value, resulted in panels that were generally inferior in moisture resistance to those in which soaked bricks had been used.

The results of the tests also demonstrated the differences in moisture penetration properties of brick masonry when the same brick is used with different mortars. For both types of brick laid dry, the panels of the 1:2:9 mortar were superior to those of the 1:3 masonry cement mortar. With the same mortar, however, the higher-suction brick appeared to produce tighter brickwork. Both types of brick laid dry with both mortars, however, produced panels that were considered quite permeable.

A few tests have been made of the strength of bond between brick and

TABLE III

INFLUENCE OF SILICONE SOLUTION CONCENTRATION ON BRICK SUCTION

Concentration of Silicone Solids (% of weight of water)	Dry-press Brick		Extruded Brick	
	Original Suction (gm/min/30 sq in.)	Suction After Treatment (gm/min/30 sq in.)	Original Suction (gm/min/30 sq in.)	Suction After Treatment (gm/min/30 sq in.)
0.05	97.5	88.1	40.7	40.1
	106.1	51.6	37.6	36.7
	115.1	72.9	38.6	34.4
	121.9	83.4	38.0	37.4
0.10	92.8	3.5	36.1	25.1
	107.8	2.8	38.4	36.4
	114.2	3.9	38.7	30.7
	117.8	2.0	40.3	21.2
0.15	—	—	41.5	4.3
	—	—	38.9	14.8
	—	—	41.0	13.7
	—	—	41.9	13.8
0.2	93.9	1.0	—	2.9
	100.7	0.6	—	5.3
	111.2	1.1	—	14.6
	115.5	0.8	—	2.6
0.25	—	—	—	1.4
	—	—	—	1.2
	—	—	—	1.6
	—	—	—	2.0

— not measured

TABLE IV

RESULTS OF MOISTURE PENETRATION TESTS

Panel	Brick Condition	Total Leakage (ml) 1 hr	Total Leakage (ml) 24 hr	Max. Rate of Leakage (ml per min)	Time for 1st Dampness
MASONRY CEMENT MORTAR + DRY-PRESS BRICK					
A1	Dry	220	8110	10	50 sec
A2	Dry	1350	33350	37	45 sec
A3	Soaked	0	1640	1.2	35 min
A4	Soaked	17	2700	2.0	25 min
A5	Silicone (0.05%)	8	3240	2.8	20 min
A6	Silicone (0.05%)	1090	16700	25	1 min
A7	Silicone (0.2%)	0	38	v. slight	6 hr
A8	Silicone (0.2%)	0	55	v. slight	3 hr +
1:2:9 MORTAR + DRY-PRESS BRICK					
B1	Dry	1	2440	2	21 min
B2	Dry	0	2260	2	6 min
B3	Soaked	11	1680	1.2	9 min
B4	Soaked	20	2216	1.9	17 min
B5	Silicone (0.05%)	62	4860	5.3	7 min
B6	Silicone (0.05%)	35	4345	7.0	1½ min
B7	Silicone (0.2%)	0	925	0.8	2½ min
B8	Silicone (0.2%)	0	400	0.7	18 min

mortar, using samples consisting of two brick, one above the other with a mortar point between. The samples were assembled and cured in the same way as the panels, and the bond strength in direct tension was determined using an apparatus and method which has yet to be reported.

For the pressed brick, duplicate samples were made for each combination of brick and mortar, while for the extruded brick the samples were made in triplicate, but not all combinations were tested. The results are presented in Table V, the bond strength expressed in pounds per square inch. In many cases the strength of adhesion was very low and the sample was broken in setting up for the test. In others, it appeared that the clamps holding the upper brick had slipped causing uneven loading and early faliure. The reproducibility of results was poor, but the influence of the properties of the materials could be distinguished.

For both types of brick used dry, higher bond strength was obtained with the 1:2:9 mortar than with the masonry cement mortar. Soaking both brick when used with the 1:3 mortar produced higher bond strengths, but the pressed brick with the 1:2:9 mortar, when soaked, produced lower strength of bond than when used dry. The silicone pretreatments generally resulted in higher bond strengths than soaking the bricks before laying.

The influence of silicone pretreatment of bricks on the transverse strength of large panels, 6½ feet high and 4 feet wide, has recently been reported (4). For brick of high suction (exceeding 25 grams per minute per 30 square inches), higher transverse wall strength was obtained when the brick were silicone pretreated, than when the brick were used dry. For two low-suction brick, lower transverse strengths were obtained from the silicone-treated brick than from the brick used dry.

The transverse strength test undoubtedly is more meaningful in a practical assessment of the influence of the silicone pretreatment than the direct tension test, since the former test simulates loads that might affect brickwork in service. The transverse strength, however, probably depends in large measure on the adhesion nor-

Continued on page 96

TABLE IV CON'T

Panel	Brick Condition	Total Leakage (ml) 1 hr	Total Leakage (ml) 24 hr	Max. Rate of Leakage (ml per min)	Time for 1 st Dampness
		MASONRY CEMENT MORTAR + EXTRUDED BRICK			
A10	Dry	2580	29000	108	45 sec
A11	Dry	2460	24500	89	45 sec
A12	Soaked	680	15000	16	40 sec
A13	Soaked	800	13180	18	50 sec
A14	Silicone (0.15%)	0	3	v. slight	3½ hr
A15	Silicone (0.15%)	1235	13610	60	30 sec
A16	Silicone (0.25%)	0	0	0	5½ hr
A17	Silicone (0.25%)	0	18	v. slight	6 min
		1:2:9 MORTAR + EXTRUDED BRICK			
B10	Dry	146	5226	8	1 min
B11	Dry	60	2600	6	45 sec
B12	Soaked	0	7250	14	25 sec
B13	Soaked	0	61	v. slight	1 min
B14	Silicone (0.15%)	1970	34060	43	30 sec
B15	Silicone (0.15%)	20	3060	3	30 sec
B16	Silicone (0.25%)	244	7404	9	1 min
B17	Silicone (0.25%)	0	48	v. slight	2 hr

TABLE V
BOND STRENGTH IN DIRECT TENSION

PRESSED BRICK Condition of Brick When Laid	Bond Strength (psi) Mortar 1:3	Mortar 1:2:9	EXTRUDED BRICK Condition of Brick When Laid	Bond Strength (psi) Mortar 1:3	Mortar 1:2:9
Dry	1.7	26.0	Dry	—	8.7
Dry	3.0	24.1	Dry	—	7.3
Soaked	10.7	5.5	Dry	—	—
Soaked	5.4	9.9	Soaked	7.4	(a)
Silicone (0.05%)	8.3	18.0	Soaked	5.5	(a)
Silicone (0.05%)	28.8	10.2	Soaked	9.8	(a)
Silicone (0.2%)	11.0	10.6	Silicone (0.15%)	4.1	11.3
Silicone (0.2%)	10.4	4.0	Silicone (0.15%)	14.7	—
			Silicone (0.15%)	29.8	—
			Silicone (0.25%)	19.5	(a)
			Silicone (0.25%)	18.9	(a)
			Silicone (0.25%)	—	(a)

— very low bond strength or broken in setting up for test
(a) Not determined

BRICK & CLAY RECORD Reports on

Ceramic Technology at Penn State

Ceramic Technology at Penn State, University Park, forms part of the College of Mineral Industries which comprises three Divisions of Earth Sciences, Mineral Technology, and Mineral Engineering. Ceramics has been taught since 1927 and graduate degrees have been granted since 1930. The number of degrees awarded up to the end of 1959 are respectively 253 B.S., 77 M.S., and 44 Ph.D.

The Undergraduate Cirriculum aims at a fundamental treatment of the principles of ceramic operations, and of the properties and uses of ceramic materials. Laboratory facilities for undergraduate work have been augmented in recent years to keep abreast of modern developments, and among new items of equipment may be mentioned additional furnaces with controllers, a vacuum extrusion press, X-ray and differential thermal equipment, strength-testing equipment at high temperatures, and an electro-ceramic laboratory. Ceramic majors take required and optional courses in engineering, physics, chemistry and mathematics, and a selection of non-technical courses. The curriculum has been accredited by E.C.P.D. as a recognized engineering course.

An Undergraduate Scholarship Program, initiated in 1954 and enthusiastically supported by the Pennsylvania Ceramic Association, has grown to a stage where 21 undergraduates now hold scholarships (or grants) usually of $500 for the school year.

An Undergraduate Library—The Keramos-Frazier Library—has been in operation for two years and is building up a collection of text-books

Vacuum extrusion press and other equipment in the Department of Ceramic Technology, Penn State.

Adjusting a high-temperature unit on an X-ray diffractometer in the Department of Ceramic Technology, Penn State.

Part of kiln room, Department of Ceramic Technology, Penn State.

and other literature of particular value for undergraduate use. It provides a valuable supplement to the main library facilities.

Graduate Studies have been prominent in the Department since its inception, and the ratio of advanced degrees, M.S. and Ph.D., to baccalaureate degrees has averaged about 1:2. With only rare exceptions, the entire faculty has been associated with both aspects of the work of the department. Fellowships and assistantships for research number about 15-20, and these together with a number of research associateships have made possible a vigorous research program.

Current Research: The present program centers around the research interests of the faculty, with most of the work falling in four or five main areas:

(1) Phase equilibrium studies and property measurements.

(2) X-ray structural studies of materials and of solid state reactions; kinetics of reactions.

(3) Studies of magnetic ceramic and electro-ceramic materials.

(4) Physical property measurements on glasses.

In addition, studies on clay mineralogy, sintering of oxides, hydration and dehydration of materials are in progress.

Future trends. The upward curve of undergraduate and graduate enrollments calls for expansion of facilities and activities, and planning in both areas is very active. The ever-broadening scope of ceramic materials and operations requires that the curriculum be kept as broad as possible. A recent survey has shown that students go out into all areas of the industry, into plant operations, into research and to the sales side of the industry. The basic philosophy is that broad ceramic training, founded on an adequate scientific basis, and with a liberal content of humanistic studies, provides men sufficiently adaptable to meet the demands of today and (even more important) of the years to come.

Coming Next Month!

A Penetrating Look At The CLAY PIPE INDUSTRY IN

The May issue of BRICK & CLAY RECORD

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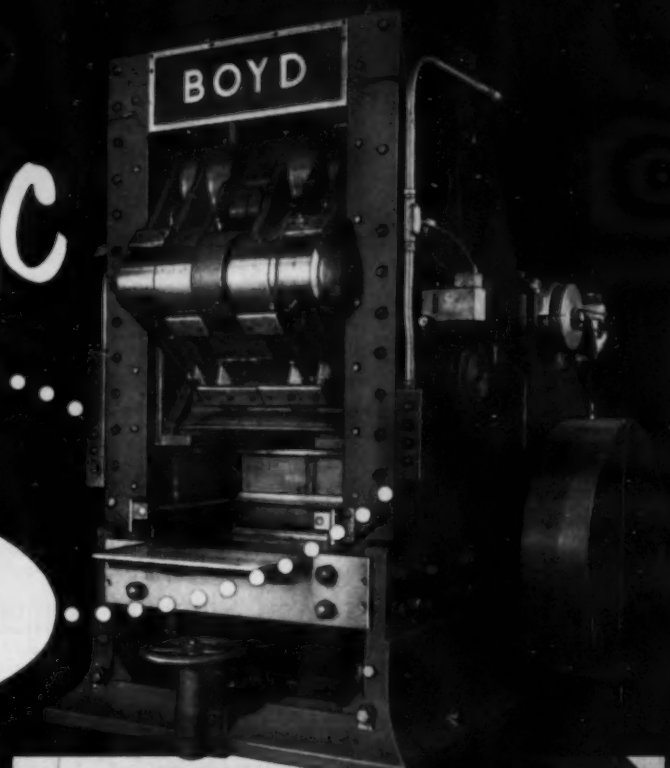


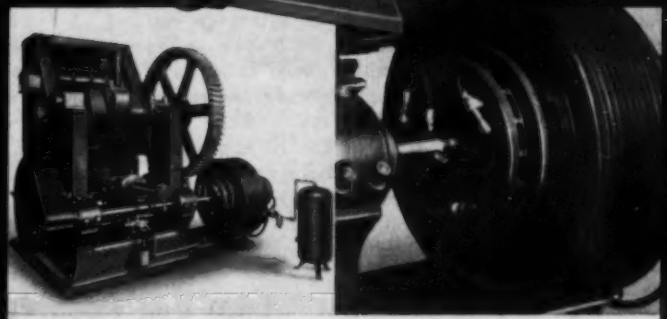
One of the important features which makes Boyd Press a truly versatile compacting machine is the variety of control mechanisms which are available. Operating controls range from a simple manually controlled air valve to complete operating flexibility as offered with BOYDAMATIC.

With Boydamatic an easily operated control panel gives you a choice of full automatic operation from the time the machine is charged to finished brick . . . or a selective combination of manual and automatic control over the following operations:

Air operation of charger • *"Inching"* • *Single stroke with automatic deairing "pause"* • *Automatic–continuous operation with deairing "pause".*

The *"inch control"* permits the operator to stop press at any point in the operating cycle. The *"single stroke"* cycle permits a range of time lapse settings for semi-automatic production of special shapes, steel clad brick, etc.

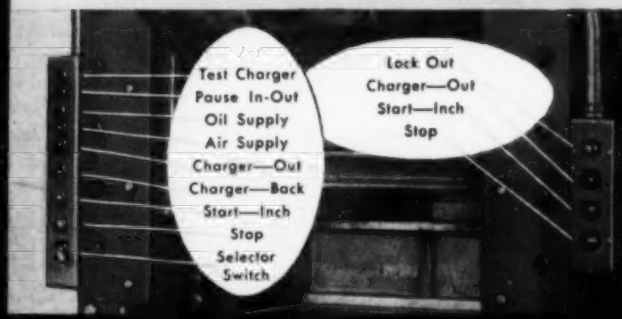
Add *selective control* to Boyd's exclusive "top 'n Bottom" compacting action; massive, rigid frame construction and you'll see why refractory producers have been translating BOYD PRESS into about 95% of the dry press refractory brick produced in this country.



Air operated charger and automatic lubrication system are shown in this rear view of Model X Boyd Press

Heart of instant response to operating controls is this positive, air operated clutch and brake assembly

Simple panel provides selective control over these operations:



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New B&CR Publishing Team

Fred L. Steinhoff

John H. Van Deventer

J. J. Svec

Fred Steinhoff Named Editorial Director

Fred L. Steinhoff has been named Editorial Director of all Industrial Publications, Inc. magazines including Practical Builder, Building Supply News, Building Construction Illustrated, BRICK & CLAY RECORD, Ceramic Industry and Ceramic Data Book, effective April 1. The firm merged with Cahners Publishing Company Inc. of Boston in October of last year.

One of the best-known figures in the ceramic and clay products industries, Fred Steinhoff joined Industrial Publications in 1916 as a subscription salesman. Subsequently he served as associate editor, managing editor and business manager of the firm's ceramic and clay products magazines and as Vice President of Industrial Publications, Inc. He is presently Executive Vice President and Treasurer, as well as Editorial Director.

He has appointed *John H. Van Deventer*, longtime Industrial Publications, Inc. executive as publisher of BRICK & CLAY RECORD, Ceramic Industry, Building Construction Illustrated and Ceramic Data Book.

John Van Deventer Made Publisher

John H. Van Deventer, longtime Industrial Publications, Inc. executive has been named publisher of BRICK & CLAY RECORD, Ceramic Industry, Building Construction Illustrated and Ceramic Data Book.

Van Deventer has served this organization continuously since 1935, coming from McGraw-Hill Publishing Co. From his earliest days as a circulation representative, he has been an advertising representative, editor of Building Supply News and Vice President and manager of the firm's New York office. During the past four years he has served as Vice President and General Sales Manager of all Industrial Publications, Inc. magazines.

"Van" brings to his new post many years of experience in all phases of the firm's publishing business, and a wide familiarity with all branches of industrial publishing. A 1929 graduate of Columbia University's School of Journalism, he is a member of Sigma Delta Chi, national journalism society, and Chicago's Headline Club.

Jerry Svec is Executive Editor

Vice President and Executive Editor *Jerry Svec* will continue to manage the editorial operations of BRICK & CLAY RECORD, Ceramic Industry and Ceramic Data Book. He has a long background in editorial practices dating back to 1942 when he joined the organization. Jerry is a ceramic graduate of the University of Illinois and has had 15 years of practical experience operating in ceramic plants prior to joining the CI-BCR-CDB staff.

Letters to The Editors

It was very kind of you to send me a copy of the Refractories issue of the BRICK AND CLAY RECORD.

It made me realize what great progress has been made with your excellent journal and I learned many interesting things about the refractory industry too. Lots of changes take place in a few years.

And I was glad to see some interesting news and pictures of many old friends.

With every good wish and my best thanks,

J. Claire Evans

Secretary of Commerce Frederick H. Mueller has asked me to thank you for your kindness in remembering him with a copy of your BRICK & CLAY RECORD.

You are right, the issue does speak for itself. It is one of which the industry can be truly proud.

Sincerely yours,
Henry Scharer
Deputy Director of Information

Thank you for your letter of Feb. 12th and the extra copy of "Brick & Clay Record". This publication is regularly received in this office and we had already read the various articles in the "Refractories" section.

We fully agree with your editorial on page 34.

Yours very truly,
Howard G. Hart
District Sales Manager
Harbison-Walker Refractories Co.

New Aggregate Producing Equipment Developed

An entirely new method of producing lightweight clay aggregate has been developed by Dean Tinker of Ohio Kilns, Granville, Ohio. This method utilizes low cost equipment and produces a variety of aggregate depending on the coal-clay mix. The aggregate can be produced in grain size or large sintered clinkers.

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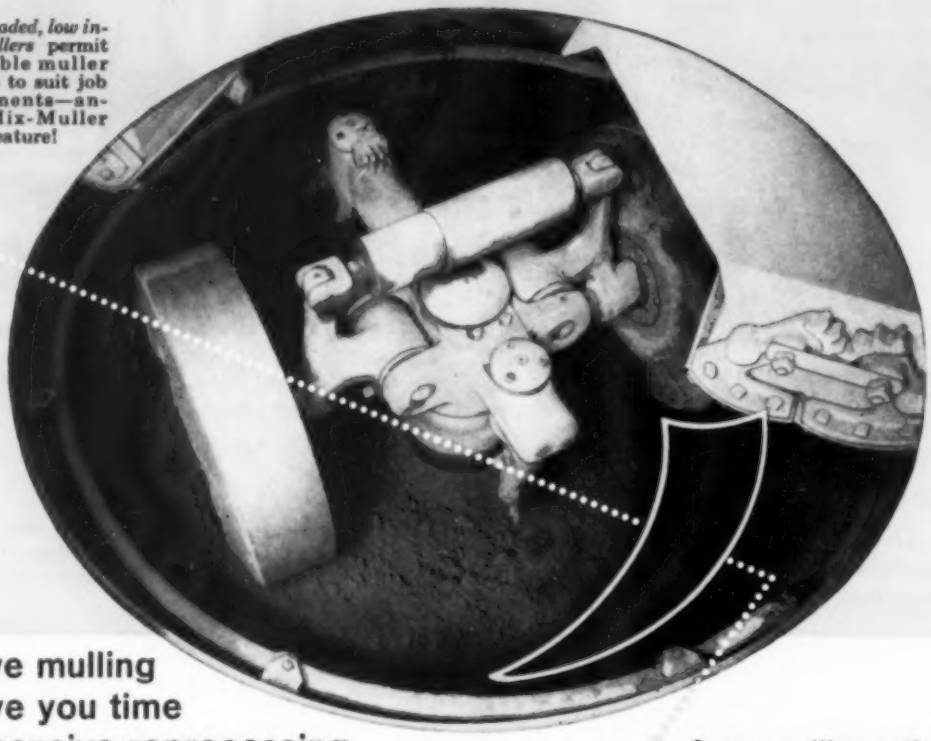

P-560-R

Intensive mulling can save you time and expensive reprocessing

The Simpson Mix-Muller is specifically designed to put *you* in control of mixed properties. In this era of expensive, high purity materials such a machine can, in one operation, help you eliminate reprocessing, remixing and slash waste and rejects simply by making the *most* of prepared ingredients.

For these reasons, the rapid increase in the use of the Simpson Mix-Muller has paralleled the increasing availability of better, more uniform and more *expensive* raw materials.

For similar reasons . . . Mix-Muller usage has paralleled a new, enlightened attitude on mixing practice among processors who have learned that careful attention to mixing operations can be their most important source for *savings*.

Can you *afford* to settle for less than controlled dispersion?

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3 way mulling action saves material, coats each grain

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Because the mullers never touch the wearplate, you get an intensive kneading of the muller against material grains—through a deep bed of material.

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The inside edges of the wheel have a shorter distance to travel than the outside edges to provide a smearing action—across the wide face of the mullers.

SPATULATE ACTION

...Note that mullers are set slightly off true radius so that as they roll they also skid sidewards to provide a spatulate action.

. . . THIS IS CONTROLLED DISPERSION

WRITE FOR HANDBOOK

—on mulling. 12-page bulletin explains controlled dispersion—gives details on 9 Mix-Muller models (¾ to 60 cu. ft. batch capacity).

Circle Service No. 133

Chattahoochee Lights . . .

Continued from page 75

waste heat from the kiln which is used in the dryer. Movement of the cars in the twin-tunnel dryer is on a scheduled push by hydraulic pushers provided by Engineering Associates.

Kiln Vestibule

From the dryer, the cars are transferred into the vestibule of the 356 foot Harrop kiln, which holds 37 cars. The vestibule is equipped with inner guilliotine doors which close prior to entry of a car into the vestibule. After the outer doors are closed, the guilliotine doors open and permit the car to be moved on its regularly scheduled push. This door arrangement keeps the drafts inside the kiln constant at all times, even when the outer doors are opened for charging the kiln.

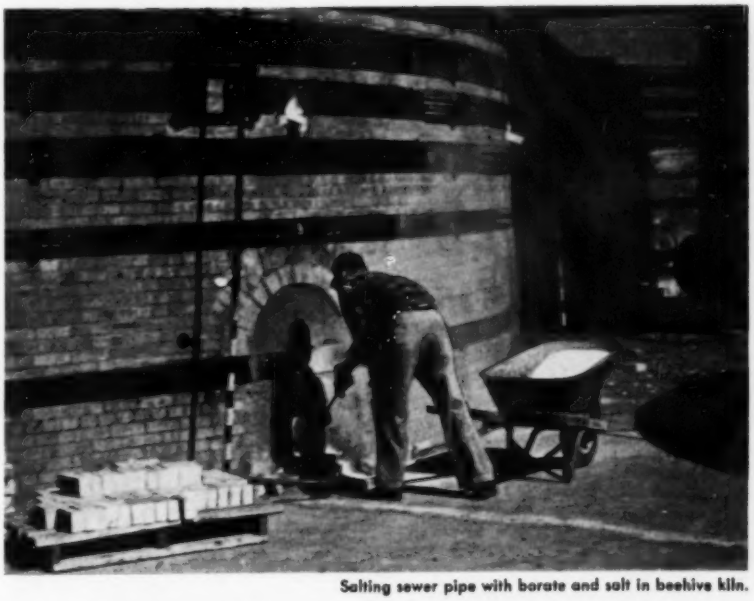
High-Temperature Recirculation

Recirculation in the preheat portion of the kiln is provided by two high-temperature recirculating fans along with excess air burners. In the recirculation zone of the kiln, 16 North American Excess Air burners are installed, eight on each side. The preheat zone of the kiln is also equipped with 26 excess air burners, 13 on each side, making a total of 42 burners in the recirculating and preheat portions of the kiln. It is felt that the use of excess air burners and fans in these two portions of the kiln provides uniform and rapid heating of the ware before entry into the furnace zone.

The furnace section, approximately 78 ft. long, is equipped with conventional North American dual fuel burners. A total of 44 burners are utilized in this section, 22 on each side. Flashing will be accomplished by the use of gas burners installed in the flashing zone immediately between the furnace section and the start of the cooling section.

Recirculation is also provided in the 146-foot cooling zone of the kiln. A special Robinson high temperature fan takes air from the crown of the kiln and recirculates it through the load serving a double purpose: uniform cooling of the ware, and the creation of an air curtain to separate the cooling zone from the furnace.

Continued on page 109



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Continued from page 87

mal to the brick-mortar interface, and on the irregularity of the brick surface by which "keying" between brick and mortar would be developed. Silicone-treated brick would usually produce a more complete extent of bond between brick and mortar, hence better mechanical keying, but the treatment may at the same time either increase or decrease the "chemical" adhesion between brick and mortar, normal to the interface.

It has been reported that when brick are pretreated with silicone before being laid in mortar, the resulting brickwork is much cleaner and freer from efflorescence than when the brick are used untreated, (3).

Prior to the tests now reported, several panels were made to test the influence of silicone pretreatment on moisture penetration. In these panels a red pressed brick was used, under the same conditions as in later tests: dry, soaked, and with silicone pretreatments. The panels of the treated brick were superior to the others in resistance to moisture penetration. Following the tests, the panels were exposed outdoors, in such a way that all surfaces were covered except the face of the panel. The panels were examined from time to time during the winter and after the first winter were retested for moisture penetration.

During the winter, panels in which the brick had been used dry and soaked were noticeably marked by efflorescence. The panels of silicone-treated brick, however, were unmarked by salt deposits, and presented a very clean appearance. The difference in the panels of untreated and silicone-treated brick was very striking, and confirms for the particular materials used the benefit of brickwork cleanliness obtained from the use of silicone-treated brick, which has been pointed out in other studies (3).

In retesting the panels after their exposure, it was found that in all cases there was an improvement in resistance to moisture penetration, as shown by slightly decreased rate of leakage and a longer time for dampness to appear on the back of the panel. The change in leakage characteristics, however, was not considered appreciable or significant.

Continued on page 97

Continued from page 96

Conclusions

Silicone pretreatment of high-suction brick by means of a water-soluble silicone which reduced the suction to a relatively low value resulted in brickwork of much superior resistance to moisture penetration than brickwork in which the brick had been laid dry or soaked in water. Brickwork panels of silicone-treated brick were cleaner on outdoor exposure than similar panels of untreated brick, which were marked by efflorescence. The bond strength in direct tension is affected by silicone pretreatment of the brick and may be increased over that obtained by the use of untreated brick. The transverse strength of walls of high-suction brick, however, has been reported to be increased when the brick are pretreated with water-soluble silicone.

This paper is a contribution from the Division of Building Research of the National Research Council, Canada, and is published with the approval of the Director of the Division.

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(3) *B. C. Carlson, Plant-applied silicones can increase sales. Brick and Clay Record, July, 1958.*

(4) *B. C. Carlson and W. D. Betts, How plant applied silicones affect wall strengths. Brick and Clay Record, July, 1959.*

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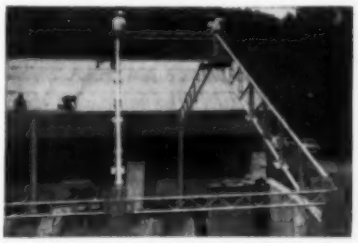
If you're due to change your address, be sure to avoid missing an issue of B&CR. Please notify us of your new address at least six weeks in advance of moving date. Write: BRICK & CLAY RECORD, 5 South Wabash Ave. Chicago 3, Ill. Be sure to give both old and new address, zone number, and your name.

5 MEN AND A CRANE; 45 TOTAL MAN-HOURS

That, in a nutshell, is the total of erection cost items for this Pittsburgh district industrial building covering an area 70 feet by 170 feet; 18 feet elevation at the eaves!



Truss halves are keyed together on the ground and raised in one unit for locking in place at the side columns. In center column construction, half-trusses are raised and locked in place at ridge and eave.

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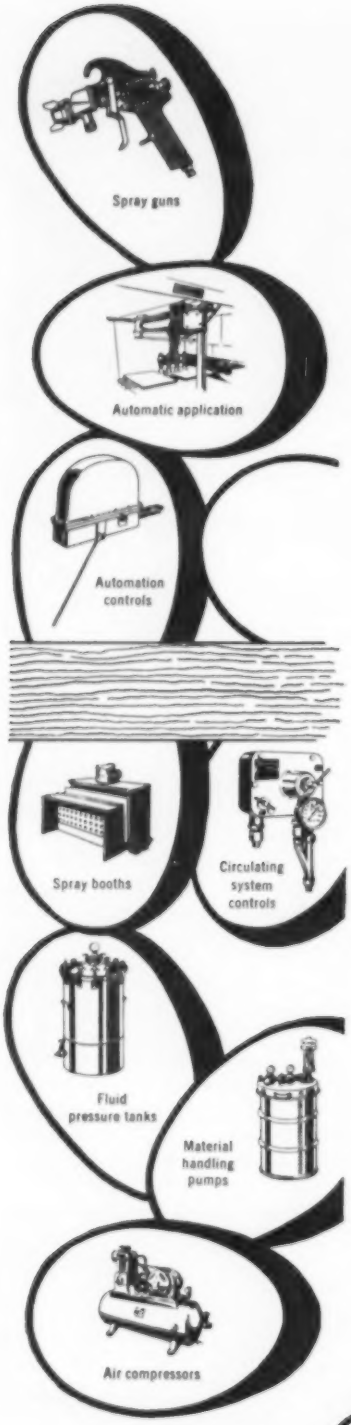

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INTIMATE BLENDING IMPORTANT FIRST STEP IN REFRACTORY MANUFACTURE

While some industries are busily engaged in trying to separate clay from sand and sand from lime and other material by screening and centrifugal air separation, and some industries are busy trying to pulverize these separate materials for fillers, stabilizers and other uses by fluid energy milling and through use of crushing equipment, other companies, like Emhart Manufacturing Company, Hartford, Connecticut, are interested not only in keeping them all together but in adding, in proper proportions, other materials. Such companies employ mixers or blenders for the job.

Emhart makes Hartford-Empire refractories and special refractory items at its Hartford ceramic plant, firing four cars a week in an 18 x 5 x 7 foot kiln. The four cars fire all week, cool over weekends, and, in their place, another four cars are introduced into the 2850°F kiln for firing.

Prior to this firing, the ingredients must be blended together properly to assure consistency in the high-temperature end-products. Intimate blending is an important first step prior to the adobe process. The various raw materials must first be mixed to form the crushed material or grog which, in turn, is used in the manufacture of bricks or special glasshouse refractories produced by Emhart's Hartford Division.

Oftentimes, the grog or crushed materials require further blending with other clays, bauxite and water for special dry-pressing of brick. Thus, Emhart must perform a dry-blending operation and a moist-blending operation for preliminary preparation of constituents of the

Continued on page 110

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featuring

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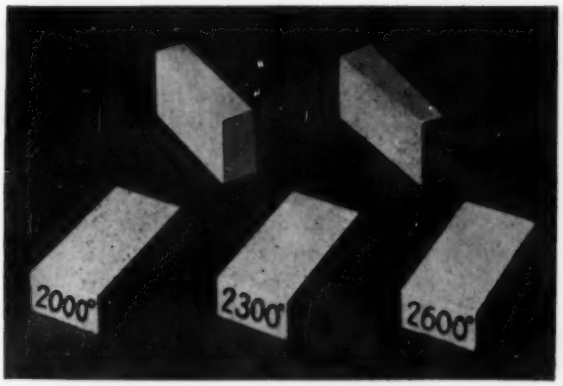

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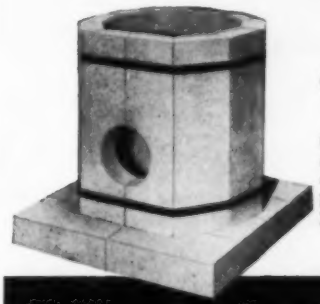

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A TESTING PROGRAM FOR THE ECONOMIC CONTROL OF EFFLORESCENCE

by T. J. PLANJE

Chairman: Department of Ceramic Engineering
The University of Missouri School of Mines and Metallurgy

Efflorescence continues to be a most troublesome problem for many structural clay products manufacturers in spite of the proven effectiveness of additives available for its control. This can by large, be attributed to the practice of using a constant amount of an additive rather than proportioning the amount of the additive to meet the specific requirements of the clay being processed at any one time. That is to say that the requirements of the clay from any one deposit will vary from strata to strata and even within strata. Failure to adjust the amount of the additive to such varying needs, not only leads to periodic re-occurrence of the efflorescence, but is also costly inasmuch as the constant addition may frequently be in excess of the amount required for effective control.

A relatively inexpensive, simple testing program of a continuing nature could do much to solve the problem. One such program, outlined below, has been developed from continuing tests at the University of Missouri School of Mines and Metallurgy, using fluorspar furnished by The Minerva Company, fluorspar producers of Eldorado, Illinois.

Sampling of Clay Deposits

Samples of the clay must be obtained in advance of mining. Most economical and wholly satisfactory is the conventional, systematic, auger drilling program adjacent to the working face. Inasmuch as an optimum interval of the drill holes would be dependent upon the variability inherent in any given deposit, this can only be established from experience. Drill samples from each drill hole should be tested separately, using a representative sample of the material from the entire depth, if the depth of the hole is equal to the working face, or representative samples from each increment of depth equal to the height of one working face.

Continued on page 102

600,000 brick/day furnace Sets 4½ Year Service Record

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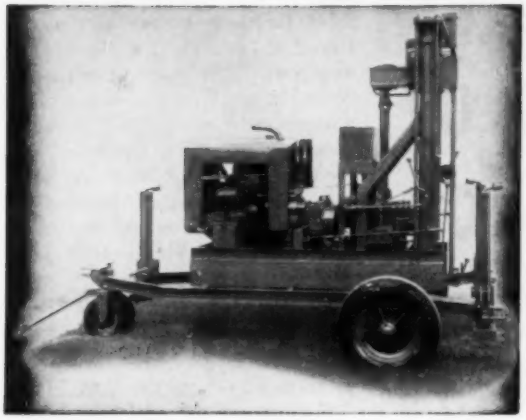

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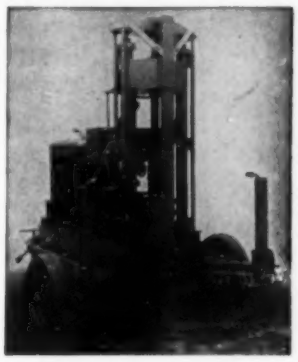

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Robeson Process Company

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Circle Service No. 140

Continued from page 100

Test Specimens

Ideally the test specimen should be a full-sized brick formed by the same procedure used in production; however, it has been found that one inch by one inch by six inch test specimens hand formed in the conventional manner are satisfactory for determining the fluorspar requirement to control green efflorescence. For this the drill sample should be crushed to pass approximately a 4 mesh sieve before quartering for a representative sample. A representative sample of some ten pounds is adequate. After drying, the sample should be ground to a particle size approximating that used in production and then divided into four lots of equal weight to which fluorspar may then be added in the amounts of 0, 1, 2 and 4%. After thorough mixing and proper tempering with water the test bars should be formed and properly designated with respect to drill hole location and fluorspar content.

Firing

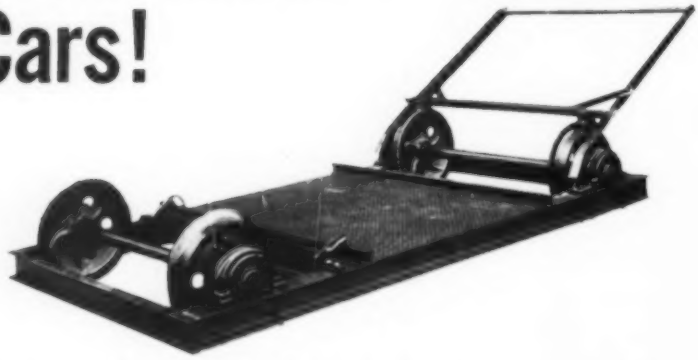
To provide results which will be indicative of the most extreme conditions to be encountered in practice, the test specimens should be fired in a production kiln and in those locations in the kiln setting known to provide the lowest heat treatment. This latter precaution is desirable in that the lowest fired ware of any setting will have the greater efflorescence tendency, and the amount of the additive employed in production should be that required for this most extreme condition imparted in firing of the ware.

Determination of Efflorescence Tendency

The standard efflorescence test as prescribed in ASTM Designation C67-57, sections 31 to 35 inclusive, should be followed as closely as facilities will permit; however, the following modification and summarizing statement of the procedure has been found adequate. After removing the specimens from the kiln and permitting them to cool to atmospheric temperature, the specimens from each sample of clay should be grouped according to their fluorspar content. Specimens of a single group should then be placed on end in a shallow metal or glass tray or pan, and distilled water added to the pan to provide depth of one inch. Specimens of different fluorspar contents or from different test holes should not be placed in the same pan, since the salts responsible for efflorescence may be dissolved from some of the specimens and be absorbed by those normally having little or no efflorescence tendency. The specimens should be kept in the water for a period of seven days during which time the water level in the pan should be maintained constant and the air surrounding the specimens should be still and be maintained at a temperature of 75 ±15° F. and a relative humidity between 30 and 70 percent. The condition of the air can be best fulfilled in a controlled

Continued on page 109

You'll Get Years of Dependable Service From Chase Transfer Cars!



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This plant means more efficient service and, as a shipping point for other NP & M products, quicker delivery for our customers in the West and Southwest. It represents another step in our expansion program designed to meet the increasing demand for our wider range of products. Those listed here are all immediately available and will be milled to your requirements.

Our consistent growth over the past 65 years is a measure of the personal service you may expect from us as well as the quality of our products.

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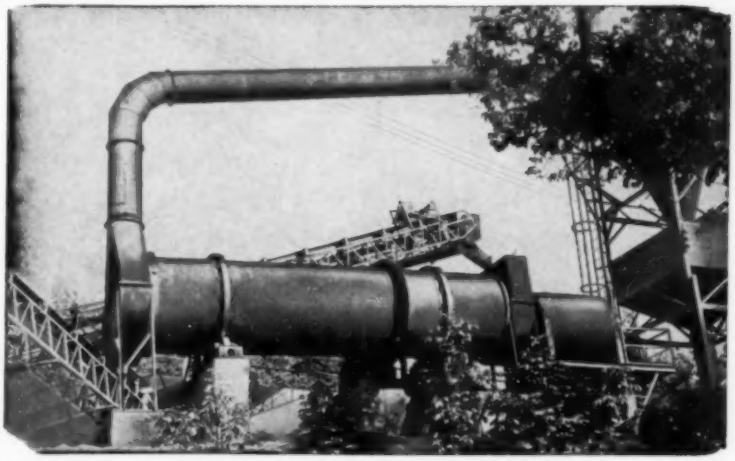

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Now you can obtain a reliable, permanent bond between steel and concrete with Furane's EPIBOND Epoxy Dowel Grouting Compound — easily, at low cost. Regular caulking equipment serves in bonding bolts, dowels, rebar, ladders and other metal parts to concrete structures.

Epibond is easy to handle, non-toxic and non-dermatitic. It is thermosetting and cures chemically at room temperatures, for a bond completely unaffected by water or chemicals present in the concrete.

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For information concerning the Furane solution to your grouting problems, write or call:

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16 units of 500 bricks each unloaded by driver alone, merely pushing buttons.

Unloads off either side. Puts loads on sidewalk where they belong. Requires less than half the unloading space that other devices need. Handles brick or block unpalleted or palleted or packaged. Not necessary to move truck. Unloads one, two or all units at one place! No chipping or breaking bottom bricks or blocks. Gentle handling. For full details, ask for Bulletin TC53.

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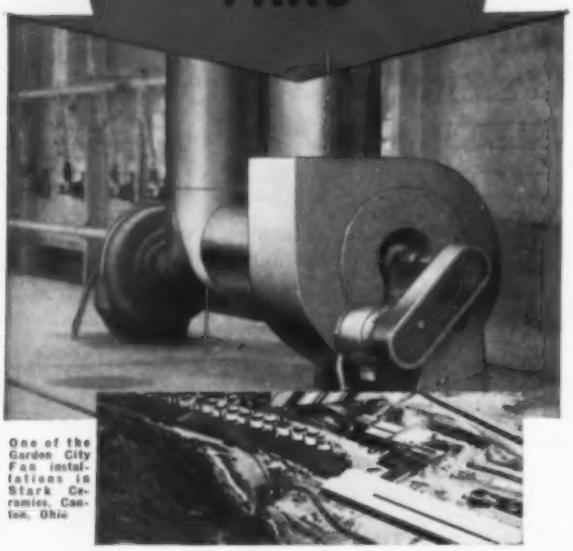

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The beautiful structural glazed facing tile (in fashion-right colors) from Stark Ceramics is rated top quality by tile experts everywhere. It is therefore a matter of pride to Garden City that this respected company prefers Garden City high temperature Thermal-Aire Fans on their kilns.

These sturdy fans perform at temperatures up to 1300°F. in the Stark Ceramics installation. Their design is "tailored" to specific user requirements: construction materials are carefully selected to withstand the user's operating temperatures. Air-Cooled Shafts protect bearings against heat. Result: low maintenance cost; long service life.

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are available in sequences to meet your needs

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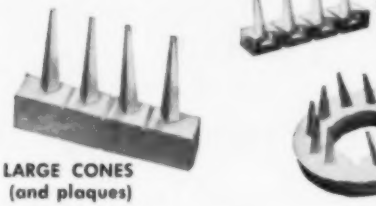

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Orton provides a single source for all your cone requirements.

LARGE CONES are available in numbers 022 to 42 inclusive, except Nos. 21, 22, 24 and 25, but including Nos. 31½ and 32½.

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Steel molds for making cones for the ASTM (P.C.E.) Test are available, but round plaques for the P.C.E. Test are not.

For further information on cones and their applications, request the free booklet "The Properties and Uses of Pyrometric Cones" and the Foundation's Temperature Equivalent Table.

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1445 Summit Street Columbus 1, Ohio

AXminster 9-8023

Circle Service No. 150

Continued from page 102

drying room or chamber; however, any area, which can be maintained free of drafts and within the temperature range indicated above without direct sun light or radiant heat from heating equipment impinging upon the specimens, will suffice.

At the end of seven days the specimens should be removed from the water and thoroughly dried, after which the edges and faces, which were not immersed in the water during the test, should be examined for efflorescence.

The smallest fluorspar addition which will prevent efflorescence in a given drill hole sample should be recorded. With these data and the systematic handling of clay in mining, storage and production will make it possible to insure that the clay in production receives the required amount of additive.

Such a pre-testing program not only permits the proper proportion of the additive, but will also suggest possibilities of blending clays from different portions of the deposit to permit the use of a nearly constant amount of additive. This not only offers the advantage of eliminating frequent changes in the feeding rate of the feeder changing the additive, but since many additives for efflorescence control are salts of the alkali or alkaline earth elements, all of which tend to promote vitrification, this practice will do much to improve the uniformity of color in the fired ware.

Alternate Procedures

Several alternate procedures can be devised to provide this control over efflorescence, but in as much as the program constitutes in reality a quality control program it must be systemically pursued, the results statistically evaluated, and conducted and accepted as a long term undertaking. Therefore, it would be desirable to provide reasonable facilities for an economical execution of the program.

Chattahoochee

Continued from page 95

Waste heat is taken from an exhaust plenum in the cooling zone as well as from the crown of the furnace section of the kiln.

A total of 126 kiln cars were supplied for this installation. The cars are nine feet, six inches long and are equipped with a superstructure made with refractories and car tops from the Stevens Firebrick Co. in Macon, Ga.

As the cars leave the kiln, they are transferred onto three unloading tracks which also serve as the return tracks to the proposed mill room. Unloading will be with fork-lift trucks and manually. At the present time most shipments from the plant are made in American Truck and Body Co's. "Packhaulers."

John Winn is plant superintendent of the Chattahoochee operation. Bill Anderson will have the responsibility of operating the new section of the plant.

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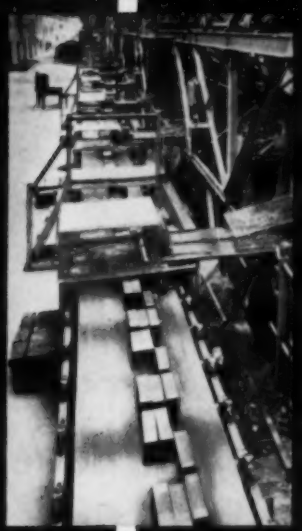

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Circle Service No. 151

Continued from page 98

quality refractory materials produced at the Connecticut location.

To perform these important steps, Emhart employs two Sturtevant rotary batch blenders, engineered and fabricated of carbon steel by Sturtevant Mill Company of Dorchester, Massachusetts. One blender has been serving the company for 15 years, the other for eight. Neither has required anything but routine lubrication and occasional cleanout.

The blender which was installed first, 15 years ago, mixes the raw materials for internal production activities. It mixes the various clays and kaolins before the extrusion process. It operates eight hours a day, two days a week, preparing material for curing or for further blending.

The second blender, installed seven years later, is used for the moist-blending of material for a special brick manufactured by Emhart. This blender operates three days a week, eight hours a day. It, too, originally was used in the preparation of grog, and could serve again in this capacity if required, without need of modification.

Both versatile units were installed in a new plant area four and a half years ago for use in their present capacity.

Here's how they work:

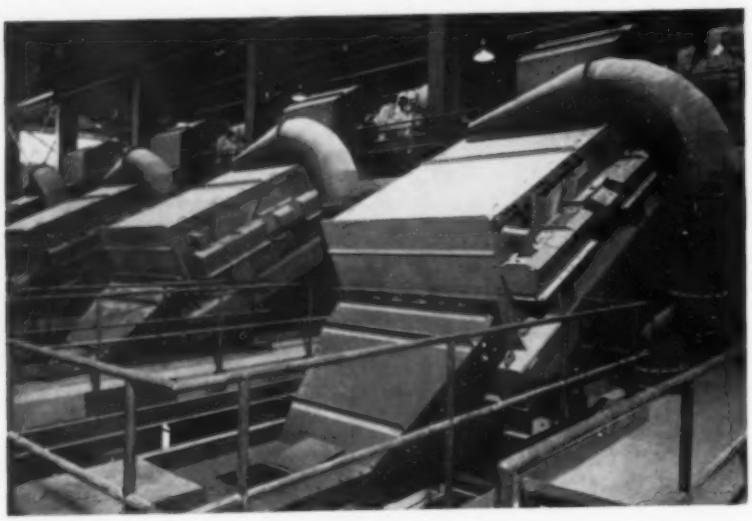
In the dry-blending of raw materials, the ingredients are fed from bags into the blender. There, a mixing action begins immediately as the powders are scooped up by revolving scoops and cascaded into the blending chamber, where the revolving motion forces the ingredients from both ends to the middle of the drum. These mixing actions are further supplemented by swinging chutes which produce a laterial mixing action.

Material Discharged

Material is introduced and discharged from the same dust-gasketed gate, and the blending action is continuous during filling and discharging, eliminating any danger of segregation. The rotary blender also eliminates, of course, any change of dead spots in the blend.

For the dry-mixing, there are no problems encountered in the blending step. For the blending of moist ingredients used for the manufacture of the specially dry-pressed brick, there conceivably could be a problem of the ingredients adhering to the inside of the units, since the blending operation is precisely the same for the moist material as it is for the dry powders.

However, the continuous motion of the machine during operations minimizes these adhesion problems. The blender, rugged in construction, may be hammered from the outside to loosen any such adhering material without damage to the unit. Also, a dogged, gasketed manhole allows one-minute accessibility to all completely-rounded, inner recesses of the blender, and to all moving parts, thus eliminating any chance of clog-up.



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The vibrating screen body—as well as the drive shaft—floats on special rubber mounts. And moving parts are designed to be in dynamic balance at all times. With all the machine's energy being used to separate the materials, there's no need for secondary building structures and supports. Many Ty-Rock screens rest in operating position by their own weight without any bolted attachments.

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A Report on the:

Comeback of the Silica Brick Industry

By H. B. Charmbury and
H. L. Lovell*

One of the basic areas of industrial activity for the mining of silica rock and the production of silica brick finds itself caught in a tightening circle. An adequate raw material coupled with more rigid specifications started the squeeze in the early forties. In addition, the development and utilization of a potentially superior product, the basic refractory brick, has been slowly but significantly advancing in recent years. A few plants are now producing the basic brick while several of the older plants, producing silica brick, have been closed.

Changes in open hearth metallurgical practices have demanded a brick which would meet more drastic conditions. Previously, a brick made with Pennsylvania ganister was satisfactory. However, with changes in open hearth operations the original silica brick was found to be inadequate. The brick would soften or melt under the open hearth conditions. This inadequacy was found to be due to the alumina content of the raw material from which the brick was made. Run-of-mine Pennsylvania ganister contains about 0.8 to 1.3% alumina. Research studies indicated that 0.3% alumina was the maximum in the original material that could be tolerated to meet brick specifications. Current washing operations reduce the alumina content to about 0.6% and consequently other material of extremely high quality had to be shipped into the area and blended with the raw ganister before use. The economics of this has prevented continuing operations and several plants have been shut down.

The availability of natural magnesite, the major constituent of basic refractories, in the Northern Hemisphere has been enhanced by the recovery of magnesia from sea water. The recent announcement of additional magnesia capacity being developed in the Southeastern United States eliminates the supply problems and may favor the economic factors in the production of basic refractories.

Ganister Not Depleted

The chief controllable variable in the proportion of the past market which silica refractories can maintain is directly related to Mineral Preparation procedures. Contrary to the

Continued on page 114

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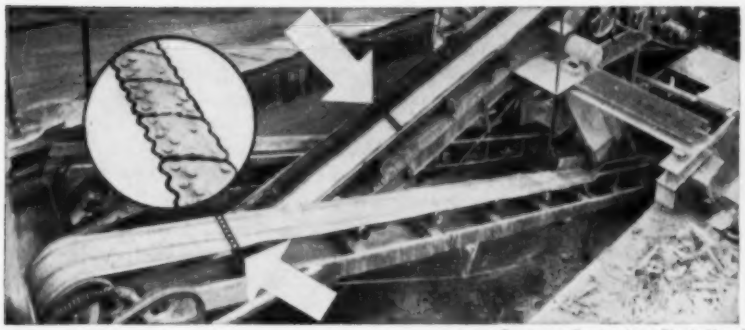

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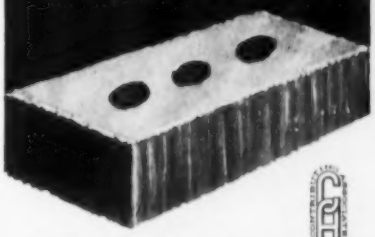

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- **Costs approximately 50c per ton of clay.**

Just 50c worth of Minerva Fluorite in every ton of clay insures precise color control of all light face brick.

This powerful flux eliminates the need for hard firing . . . prevents formation of green scum by permanently locking vanadium and iron salts inside the brick.

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Circle Service No. 158

Continued from page 112

general characteristics of the mining industry, the extensive American ganister deposits are neither depleted in volume nor in quality. The establishment of increasingly severe alumina specifications alone has created the current brick quality dilemma. Further decrease in alumina specifications do not appear probable. Over the past fifteen years, the industry has followed two major defensive approaches.

The development of silica pebble conglomerates has provided an adequate quality raw material with minimum preparation costs. A crushing, washing and sizing operation will usually remove associated impurities. However, the shipping costs from the deposit to the brick plant, which are traditionally located near the source rock, have introduced a new factor. The brick quality demands have permitted pebble use. Plant relocations have occurred, to situations nearer the pebble source of the consuming mills. The advantages of decreased product shipping charges and rapid delivery have minimized the economic disadvantages. The higher efficiency and quality control associated with newly designed plants also must be recognized. The pebble reserves are available, at least for the near future. There is also some evidence that unexploited ganister-type deposits exist which may be prepared nearly as easily as the pebble conglomerates. Opinion among manufacturers and consumers as to quality comparison between ganister and pebble brick varies.

Efforts to prepare the conventional ganister deposits have not been extensive. Geological investigations for higher quality stone and attempts to employ selective mining procedures have been helpful but have not provided a solution. The pessimistic future has not favored industrial ganister preparation research.

Ganister properties present contradictory characteristics which are not encouraging. Most ganister deposits are variable both within and between geological strata which makes practical selective mining ineffective. The occurrence of occasional macro partings of clay may be avoided or removed by rough surface washing. Thus a washing-scrubbing plant, utilizing selectively-mined rock, was constructed in Pennsylvania in 1948. The alumina content was lowered by a factor between ⅓ and ½ by sizing and scrubbing 2 inch by ½ inch particles in a ball mill without a ball charge. Recovery was satisfactory but the disposal of fines from the washery effluent imposed a problem. The product alumina quality was improved but was still inadequate.

The removal of the non-liberated alumina poses a formidable problem but it is not without possible solution. The decreasing tonnages envisioned further decrease economic success. The bulk of the alumina occurs as clays in thin shell-like coatings surrounding the silica grains. Some exist as minute pockets. The real paradox results from the ceramist's size specifications which require brick feed sizes much larger than those necessary to achieve clay liberation. Even by communition to natural grain size, when the clays tend to concentrate in the extreme fines, the clay-shell is not completely removed.

Chemical techniques will yield the required grades but do not appear to be economically feasible. A sulfuric acid leach will produce a ganister containing less than 0.3% alumina. Preliminary alkaline sintering is even less practical. Amine flotation of the clay from the silica has yielded a 0.15% alumina product with 85% recovery using feeds of −28 mesh.

The tendency of the clays to concentrate in the fines upon comminution offers a most promising approach. The surface scrubbing on large sized particles in the Pennsylvania plant was partially effective. In 1955 a similar plant was put into operation in Utah which was more successful by reducing the top size to one inch to scrubbing. Since the ultimate brick feed is normally limited to a top size of less than ¼ inch, the scrubbing of the final feed ganister with subsequent removal of the high alumina fines offers a possible practical solution for continued use of ganister.

*The Authors are Professor and Assistant Professor, respectively, of Mineral Preparation at the Pennsylvania State University, University Park, Pennsylvania.

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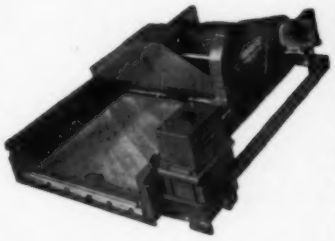

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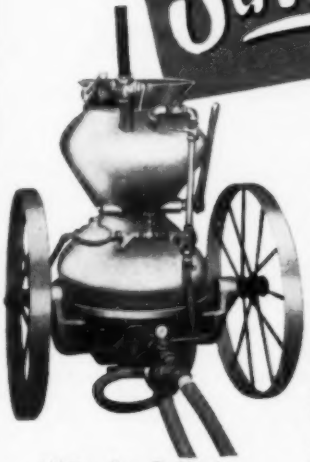

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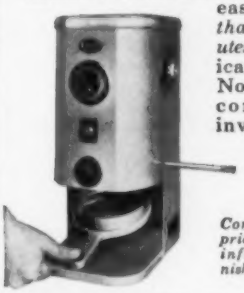

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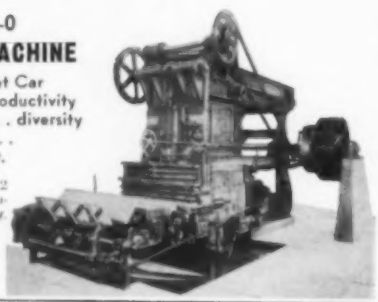

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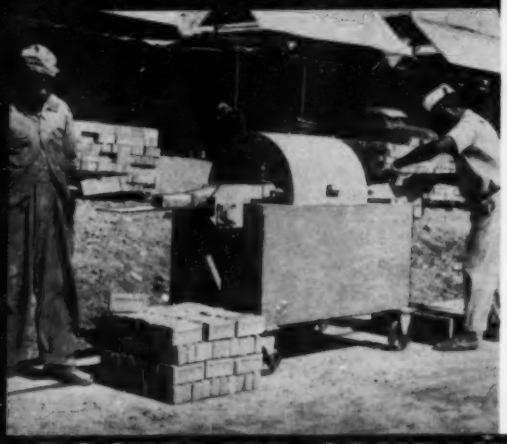

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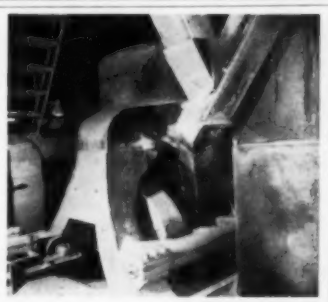

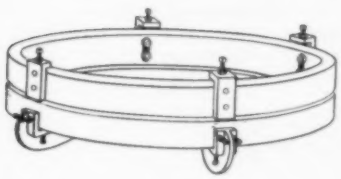

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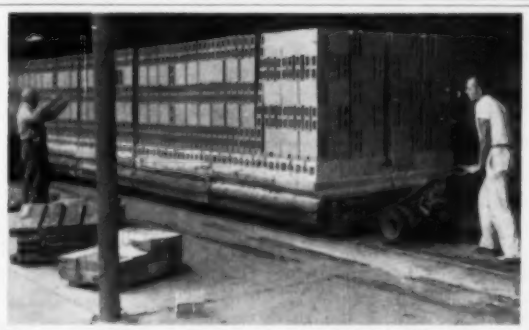

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Marion 490E....2½ yd. electric
Marion 4101....2½ yd. electric
Link-Belt K580....2½ yd. diesel

CRANES

Marion 381....2 yd. diesel
Shovel attachment for above
Browning M1....1¾ yd. loco-diesel
Industrial Brownhoist 8....1½ yd. loco-diesel
Link-Belt K48....2 yd. diesel
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STOP GREEN SCUM

Insure Permanent Color-Control On Light Face Brick with MINERVA FLUORSPAR

Minerva Fluorspar vitrifies brick at low temperatures. Prevents migration of vanadium salts to surface of brick where it oxidizes to form green scum.
COSTS APPROX. 50c per ton of clay. Send for free booklet and free Test Sample. Write Today to

THE MINERVA COMPANY
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RAILS AND DRYER CARS

250 Single Deck Dryer Cars
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All sections rails and track supplies.
New Wood Pallets made to your specifications.

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FALL BARGAINS

DE-AIRING MACHINES, #30 JC Steele FRH #6WJ6, Bonnot Combination, Chambers #9C, American 404-A, International #470, International Falcon.

CUTTER, Steele #18, Model BLH, Freese C-25, and C-20.

ROLLS, Disintegrating, Steele 24 x 24, 12 x 24, smooth roll 18 x 24.

DRY PAN, 9' Stevens, 9' Bonnot.

SCREENS, Tyler Hummer, Cedar Rapids, Sturtevant.

DRYERS, Rotary. Various sizes from 2x30 to 8 x 175.

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BRICK MACHINES: (dealred) FRH Jr. Steele 30, 40B, 50. Amer 290. Intl 477. Others Steele #1, #2, #5A. Ray. Freese GH & GCS.
1 to 3 yd SAUERMANS. Also LOADERS.
Boyd 4 mold, Gates 2 mold DRY PRESSES
4, 5, 6, 8, 9' DRY PANS. 8' WET PANS
MILLS: 10, 11, 12', PUG. Raymond 5057 Roll. 2424. 3630. 3650 Dixie. Williams 4 & 5 Hammer
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2—SYMONS 3' short head crushers
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Side Dump Cars: 120—1½, 2, 3 and 12 Yards
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Diesel Locomotives: 6, 10, 25, 45, 65 and 80 tons
Smooth Roll Crushers: J. C. Steele 12" and 18"
Automatic Cutter: Freese Model C-25
Rotary Dryers & Kilns: 4'x20', 5'x30', 5'6"x50', 80"x60', 6'x125', 7'x150', 8'x125', 10'x200'

WANTED—Air Compressors—Dryers—Locomotives

R. C. STANHOPE, INC.
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1-Toronto 6' Type "C" Dry Pan with 20 HP chain drive with new screen plates and all new wearing parts. Can be converted to Wet Mixing Pan. Good condition, rebuilt and guaranteed.

THE TORONTO FOUNDRY & MACHINE CO.
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FOR SALE—12' Pug mill, 35" smooth roll crusher, 20" coal crusher, 60" Disc feeder, 54" waste heat fan. Trevor Tile Co., Trevor, Wisconsin. 4-2

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30# RAIL—50 TONS
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FOR SALE—Steele 40 De-Airing Brick Machine—Two drain tile cutters—One end cutter—One disintegrator—Three transfer cars—One steel No. 1 brick machine—One WW hammermill—Several Electric motors—One hand cutter—Eagle nine foot dry pan—Raymond nine foot dry pan—All in good condition—Bill Taylor, Sulphur Springs, Texas. 4-1

WANTED—USED EQUIPMENT

WANTED—Used type 2BT F-R-H Drain Tile Cutter. 13½" Cut. Must be in first class condition. Chehalis Brick & Tile Co., Chehalis, Wash.

WANTED: Used Maxon straight type ventilte gas burners—with HD 3"-30, Stictite nozzles, 7/32" drill orifice. Mason City Brick and Tile Company, Mason City, Iowa.

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See New Ideas on Brick & Tile Plants
Inspect Unusual Construction Jobs

SECOND CLAY INDUSTRY EUROPEAN TOUR

A group of clay product manufacturers now forming will leave via Trans-Atlantic Airways approximately August 1 for a 30-day tour of interesting clay products plants, unusual brick and tile construction, also pre-stressed clay product construction—plus an opportunity to do plenty of sight-seeing in Europe's most interesting places.

COUNTRIES TO BE VISITED

Scotland	Sweden	Germany	Switzerland	Spain
Norway	Denmark	Austria	France	

Tour fully conducted, completely arranged for: All food and lodging, transportation, sightseeing, and plant tours, plus skilled interpreters. Ladies sightseeing tours planned for times when men are plant visiting. Tour arranged so men will have plenty of time to see highlights of general interest as well as spending part of time on business.

Reasonable cost for entire trip . . . list will be closed when quota filled. Write immediately for information to:

Box E.T., BRICK & CLAY RECORD
5 South Wabash, Chicago 3, Ill.

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Fernholtz Machinery Co., 8468 Melrose Pl., L.A. 46

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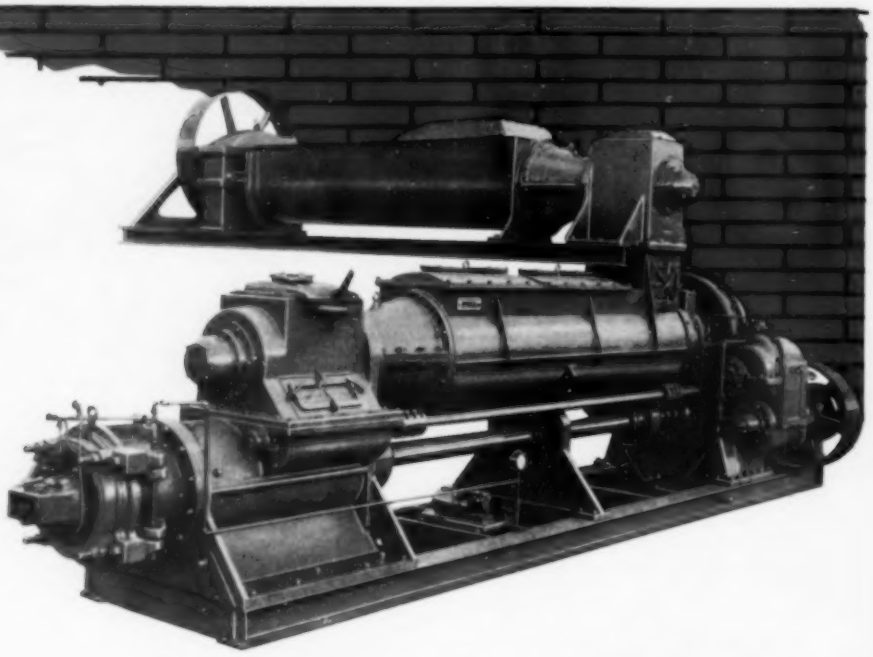
International—Man Cooler Fans, Blast Coolers, and Axial Blowers, for kilns, plant, aisles, drying floor, and stacks. Capacity up to 100,000 CFM and static to suit requirements. Pedestal and low leg mounting also supplied caster mounted. All units safety enclosed. Write us stating your requirements.

Free Bulletin 103-ABC

FERNHOLTZ MACHINERY CO., 8468B MELROSE PLACE, LOS ANGELES 46, CALIF.

Circle Service No. 175

Will Vacuum Pugging Help You?



The No. 60-FV Vacuum Pug Sealing and Vacuum Extrusion Machine, provides *eleven* feet of totally enclosed vacuum pugging in its 30" diameter closed pug mill. This is in addition to the 11' 6" of open pugging in the 30" width pug tub of the No. 50-F Pug Sealer which is shown feeding the 60-FV machine.

The 60-FV also provides an additional compression and shredding of the clay. So the 60-FV - 50-F installation pugs the material twice (once under vacuum), compresses and shreds the clay twice, and extrudes under vacuum. It thus provides the most intensive preparation imaginable.

The 60-FV is a Separate Drive machine of the combined type. Its vacuum pug-sealer and its vacuum extruder are separately powered and controlled. The 50-F Pug Sealer, of course, has its own drive. The three independent drives provide the ultimate in control. The danger of overfilling the vacuum chamber and/or the vacuum pug mill is thus eliminated. The three drives can safely handle over four hundred horsepower.

Low plastic materials, granular materials, extremely hard shales, and blends of materials requiring thorough mixing are *all* greatly benefitted by vacuum pugging. STEELE vacuum pugging equipment is operating successfully in scores of installations. No user of STEELE vacuum pugging equipment has subsequently installed equipment without vacuum pugging.

Write us for complete information.

Pacific Agents: Walter C. Stoll, 5028 Alhambra Avenue
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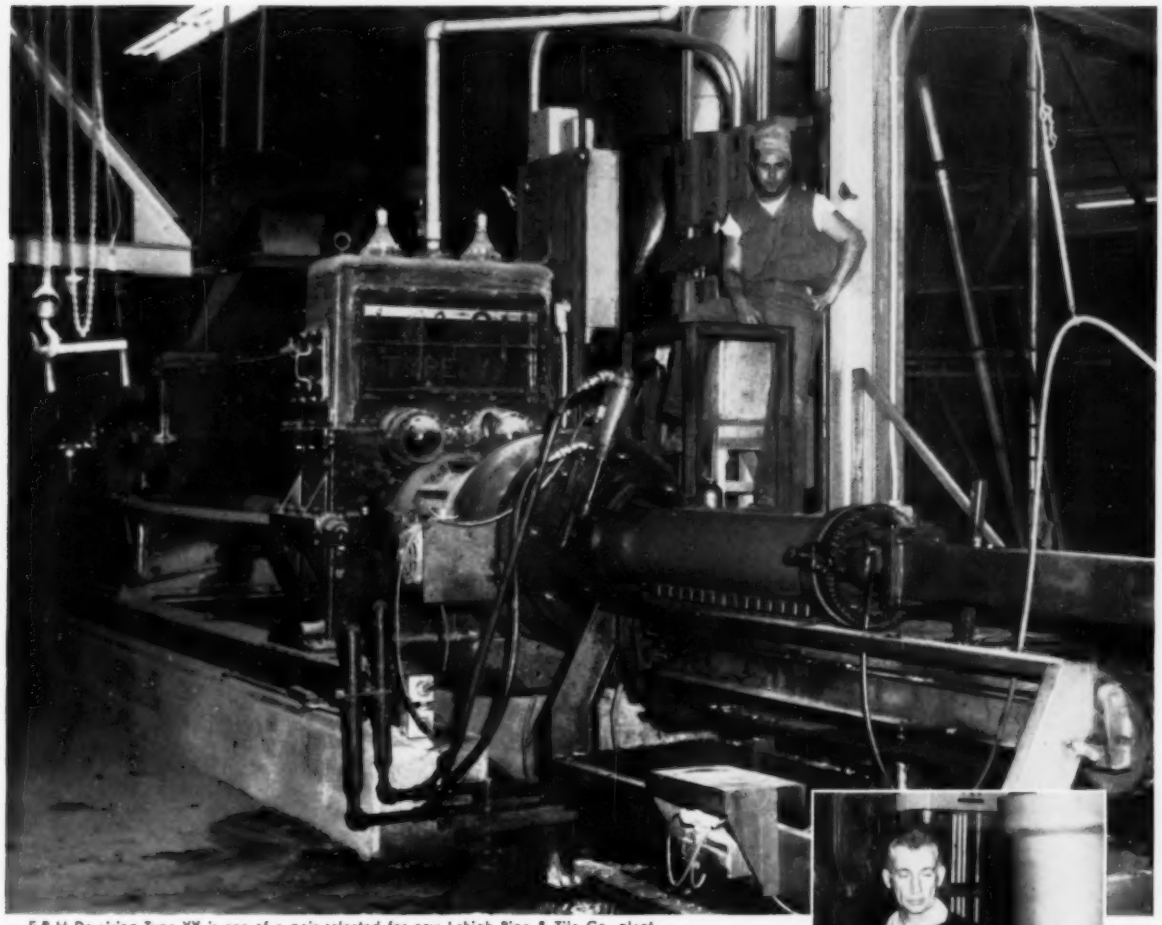
J. C. Steele & SONS, Inc., Statesville, N. C.

• THE BEST IN CLAY MACHINERY SINCE 1889 •

Circle Service No. 176



F-R-H De-airing Type YX is one of a pair selected for new Lehigh Pipe & Tile Co. plant.

F-R-H Extruders Installed at modern Lehigh Pipe and Tile Company plant...

FORT DODGE, IOWA

Manager Joe Bryant checks sewer pipe from F-R-H WJ machine.

Automation is the keynote at the brand new $2,500,000 tunnel kiln plant recently built near Fort Dodge, Iowa, by Lehigh Pipe & Tile Co. Adjacent to the firm's original plant which now produces large diameter pipe, the new installation turns out small pipe ranging up to 12 inches in diameter and up to 5 feet in length.

The new addition also produces flue lining and 4" to 12" drain tile. Everything is keyed to manufacture highest quality clay products—at peak efficiency; plus minimum operating costs. With this end in view, two high capacity F-R-H De-Airing Extruders were installed to serve dual horizontal production lines.

Twin screw feeders move clay from storage bins to the pug tubs. The whole operation, from bin to extrusion, is controlled by one man at each of the machines. Pipe is automatically extruded, trimmed, finished and set on pallets. Lift trucks handle palletized loads to the dryer and tunnel kiln.

F-R-H Ceramic Machinery can reduce your operating cost and improve your profit picture. For an analysis of your requirements, send a brief outline of your operations to The Fate-Root-Heath Company, Dept. B-1, Plymouth, Ohio.

F-R-H

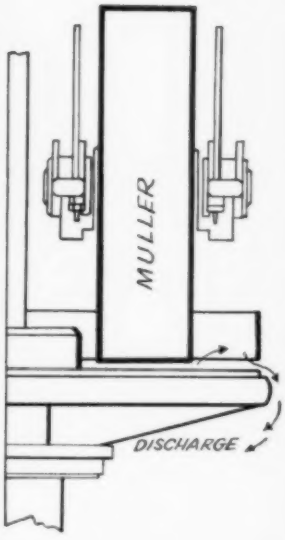
CERAMIC MACHINERY

FOR 100% OPERATING EFFICIENCY—ORDER GENUINE F-R-H REPLACEMENT PARTS DIRECTLY FROM THE FACTORY

Circle Service No. 177

PUTS PROFIT IN CLAY PRODUCTION

A TON A MINUTE CAPACITY



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Crushed material is thrown off by centrifugal force between the moveable liner walls of rim and revolving base. Moist material does not clog opening . . . discharge is positive.

The "American" No. 384 Grinder has been designed to handle big volume grinding . . . A TON A MINUTE capacity. It will efficiently handle hard clay, shale and other similar material used in the manufacture of brick and other clay products.

Materials can be handled wet or dry with the "American" No. 384 Grinder . . . there are no screen plates to clog or slow down production. Other important features include: low initial investment . . . requires a minimum of valuable plant floor space . . . less power consumption . . . and performs efficiently and dependably with only a minimum of maintenance.

Other "American" Grinders range in capacity of from 15 to 80 tons per hour. Investigate the production features of "American" Grinders . . . consistently specified by experienced clay manufacturers.

American CLAY MACHINERY

A Division of HUBER-WARCO COMPANY
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OVER A CENTURY OF EXPERIENCE IN THE MANUFACTURE OF CLAY MACHINERY

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